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AND

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RELATING TO

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INSECTS, WORMS, ZOOPHYTES, &c.

THEIR HABITS, FOOD, RETREATS, OCCASIONAL APPEARANCE,
MIGRATIONS, NESTS AND YOUNG.

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*Descriptions of several new Species of Nepticulæ; with Critical Remarks on others.**

Group I.

1. N. pomella, *Stt.*, *Vgh.*

Capillis cum penicillis ferrugineis, antennarum conchula flavido-alba; alis anterioribus vix nitidis, cæruleo-nigris, ciliis obscure griseis. Exp. al. $2\frac{1}{6}$—$2\frac{1}{3}$. lin.

Vaughan, *Intell.* 1858. *Stainton*, *Man.* 2, 431. Pygmæella, *Frey*, *Tin.* 371, 3. *Linn. Ent.* xi. 371, 3 (excl. ref.)

The frontal tuft, as also the cervical tuft, is bright ochreous-yellow, the latter a little paler; the eye-caps are rather large, whitish, inclining somewhat to yellow; the antennæ of the female are half as long as the anterior wings; those of the male perceptibly longer, are blackish, at the base more or less silvery gray; the abdomen is blackish gray, beneath paler gray, especially towards the anus; the anal tuft not yellow; the legs are dark gray, the middle tibiæ and the tarsi yellowish white. The anterior wings are moderately broad, rather coarsely scaled, of a uniform bluish black-brown, with a faint olivaceous-bronzy tint; the apical cilia dark gray, those of the anal angle rather paler, at their bases with some scattered scales of the ground colour projecting into them. Posterior wings and their cilia are of the colour of the cilia at the anal angle of the anterior wings.

That the N. pygmæella of Frey should be referred to this is evident from a communicated specimen, which is only a little paler, and which was likewise bred from apple-mines; but I cannot believe that this species is the N. pygmæella of Stainton. Stainton, in the 'Natural History of the Tineina,' vol. i. p. 192, distinguishes the latter from its allies by the pale ashy gray ground colour of the anterior wings, and in his description calls the latter pale ashy gray, with a very faint violet tint towards the apex, with paler cilia; the colour of the posterior wings he calls whitish gray. All this does not suit for our N. pomella. On the other hand, I possess some caught specimens which I unhesitatingly refer to N. pygmæella, *Stt.*: they have more finely scaled, more shining anterior wings, of ashy gray colour, towards the tip rather of a bluish violet, and the cervical tuft is whitish. If Frey received our N. pomella from Stainton as N. pygmæella, this may easily have happened before N. pomella was distinguished from N. pygmæella; for that both species were previously united under the latter name is manifest, since, in the 'Natural History,' p. 191, Stainton gives whitethorn and apple as the food of N. pygmæella, but in the 'Manual' he assigns whitethorn to N. pygmæella and apple to N. pomella.

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* Translated from 'Some Remarks on the Species of the Genus Nepticula, by H. von Heinemann in Braunschweig,' which appeared in the 8th and 10th numbers (August and October, 1862) of the 6th volume of the 'Wiener Entomologische Monatschrift.'

N.B. The introductory portion of that paper has been translated and published in the 'Entomologist's Annual' for 1863, pp. 36—50.

Of the remaining allied red-headed unicolorous Nepticulæ, N. oxyacanthella, N. desperatella and N. Aucupariæ are much smaller, and have shorter antennæ. N. oxyacanthella comes nearest in colour, but the colour of the anterior wings is much brighter blue, especially towards the apex; the cilia are grayish black; the very small, often scarcely perceptible cervical tuft is whitish instead of yellow; the middle tibiæ are only a little paler. N. desperatella has no pale cervical tuft; the anterior wings are much smoother, with finer scales, as though polished, coppery brown or brownish or greenish bronze, entirely without violet or blue. In N. Aucupariæ the large cervical tuft is whitish; the anterior wings are smoother and more finely scaled, olivaceous, only with a violet gloss towards the tip. N. ruficapitella and N. æneella have also the cervical tuft more whitish, and the ground colour of the anterior wings greener; in the last-named species the violet tint is wanting, or at least much fainter; in N. ruficapitella it is much brighter at the apex of the wing. N. pomella may have the greatest resemblance to N. rhamniella, *H.-S.* (Corresp. Blatt. 1860, p. 60), a species with which I am unacquainted. This has likewise the cervical tuft orange; the anterior wings coarsely scaled, grayish violet, with the scales projecting irregularly into the cilia; but the remark that the eye-caps are less whitish than the cervical tuft, and that the anterior wings are shining, does not apply to our species.

The larva is ochreous-yellow, and mines in apple-leaves in October. The mine expands like a blotch, and is recognized by its rusty yellow colour. The cocoon is oval, rather flat, and of a reddish brown colour.

N. pomella has been observed in Brunswick, Hanover, Frankfort-on-the-Maine and Zurich, besides England.

2. N. ÆNEELLA.

Capillis ochraceis, penicillis et antennarum conchula flavida; alis anterioribus parum nitidis, olivaceo-æneis, apice obscurioribus parum violaceo tinctis. Exp. al. $2\frac{1}{2}$—$2\frac{3}{4}$ lin.

?Pygmæella, *H.-S.*, v. 348, 1090 (Corresp. Blatt. p. 53).

So like N. ruficapitella that it is hardly possible to distinguish them. The only difference which I can find out is that the anterior wings in N. æneella are somewhat smoother and more shining, and have a perceptibly fainter bluish violet tinge than N. ruficapitella, since only the extreme tip and the base have a slight violet gloss; whereas in N. ruficapitella there are more or less numerous violet scales on the entire disk, and the tip is much brighter blue or violet. It is also very near to N. Aucupariæ, but the latter has the anterior wings paler and more shining and more finely scaled, the frontal tuft pale ochreous-yellow, the cervical tuft and eye-caps whiter, and the antennæ shorter. N. anomalella and N. desperatella are likewise more finely scaled and more glossy, and have shorter antennæ; the former has, besides, a brighter violet at the apex of the wing, blackish gray instead of brown-gray posterior wings, and dark middle tibiæ; the latter species has the anterior wings more of a coppery olive-brown.

The frontal tuft rusty yellow, the cervical tuft and eye-caps yellowish white, the abdomen black-gray, beneath white-gray, with pale yellow anal tuft in the male. The middle legs are whitish, with only a faint gray tint on the tibiæ; the hind legs gray, with the tibiæ and tarsi whitish beneath. The anterior wings are more coarsely scaled, olivaceous-bronze, with somewhat of a golden gloss; a faint violet tint at the base; the tip for a slight extent brownish purple or violet; beyond it the cilia are dark gray. The posterior wings are pale brownish gray, with the cilia rather darker.

The larva and mine resemble very closely those of N. oxyacanthella. A year ago I had collected together the mines of N. oxyacanthella on whitethorn and apple, and obtained several specimens of N. æneella, which I took for N. oxyacanthella, and sent away under this name. Last autumn I separated the whitethorn-mines from the apple-mines, and obtained from the former N. oxyacanthella, from the latter N. æneella, and the last named certainly from mines both on wild and cultivated apple trees.

I suspect that Herrich-Schæffer's N. pygmæella belongs here; it is certainly not Stainton's species, since that has pale ashy gray anterior wings.

3. N. SAMIATELLA, *H.-S.* (*Zll.*)

Capillis atris, penicillis et antennarum conchula albis; alis anterioribus subnitidis, virescenti-æneis, apice violaceis, ciliis griseis. Exp. al. 2⅓—2½ lin.

Zeller, *Linn. Ent.* iii. 303, 1 (♂). *Herrich-Schæffer*, v. 348, 1087, fig. 835.

4. N. ATRICAPITELLA, *Hw.*

Capillis cum penicillis atris, antennarum conchula alba; alis anterioribus subnitidis, virescenti-æneis, ciliis nigro-griseis. Exp. al. 2¼—2½ lin.

Stainton, *List of the spec. of Br. Anim.* xvi. 166; *Ins. Brit.* 297; *Man.* ii. 431. *Herrich-Schæffer*, v. 397, 1086. *Frey*, *Tin.* 370, 1. *Linn. Ent.* xi. 368, 1.

Frey refers Herrich-Schæffer's N. samiatella to N. atricapitella, *Stt.*, with the remark that one of Stainton's original specimens of N. atricapitella, communicated to him by Herrich-Schæffer, agreed precisely with a number of Frey's bred specimens, which Herrich-Schæffer had pronounced to be N. samiatella. Whether some error has here occurred in any way I will leave undecided, but at any rate amongst the black-headed oak Nepticulæ which come nearest to N. ruficapitella I certainly find two species to which the differential characters assigned by Herrich-Schæffer apply; only with regard to size I have observed no perceptible difference, since all specimens measure 2½ lines, or rather more or less, yet on the whole N. samiatella appears to be a trifle larger, and to have the wings rather narrower, whereas in N. atricapitella the anterior wings are broader and shorter. The ground colour of the anterior wings is in both species of a shining greenish bronze, but more greenish in N. atricapitella, more bronzy and more shining in N. samiatella; the tips of the scales are more or less violet-blue, especially towards the apex of the wing, often also along the costa, but more so in N. atricapitella, where, especially in the female, the costa and apex of the wing are often entirely blue, and sometimes the entire wing has a bluish gloss. The cilia are blue-black; their apical half, from the apex of the wing to the anal angle, is pale gray, in N. samiatella, perhaps a little paler; at the inner margin they are blackish gray, and in the female of N. atricapitella they extend nearly to the base of the wing, without perceptibly decreasing in length, and in set specimens they distinctly lie over the posterior wings. These latter are brownish gray in N. samiatella, bluish black in N. atricapitella, with somewhat of a bronzy gloss; the cilia in the former are paler gray, in the latter bluish black, only grayish at the tips; the dark colour of the costal cilia is very striking in N. atricapitella, especially in the female. The male of N. samiatella has, from the anal angle to the middle of the inner margin of the posterior wings, a second row of stouter and shorter scale-like cilia, which are longest at the anal angle, and become gradually shorter and cease in the middle of this margin; they generally stand somewhat erect, with the tips turned upwards, and reach nearly to the middle of the other cilia, forming with their tips to some extent a divisional line in the cilia, which in the middle of the inner margin flows into it. These scales are wanting in N. atricapitella. The cervical tuft is yellowish white in N. samiatella, black in N. atricapitella. In the males of both species the antennæ are of nearly equal length, nearly two-thirds as long as the anterior wings. In the females of N. atricapitella the antennæ are scarcely perceptibly shorter, whereas in the females of N. samiatella they are barely half as long as the anterior wings. The anal tuft is grayish in N. atricapitella ♂, more yellowish in N. samiatella ♂; in the females of both species the tip of the abdomen is rusty yellowish, though to a different extent.

I do not doubt that these two species are those of Herrich-Schæffer, and that Stainton's species is identical with the species of the same name in Herrich-Schæffer. Frey's species seems doubtful, since his notices suit for both species. Zeller's N. samiatella ♂ is also probably Herrich-Schæffer's N. samiatella, since this comes nearest to N. ruficapitella in form and colour of the anterior wings.

I have bred numbers of both species from the larvæ, though but few males of N. samiatella, without being able to find any difference between the mines or larvæ, or between those of N. ruficapitella. The excremental track is very variable,—sometimes like a thin line, sometimes it almost fills the entire mine, but generally it is midway between the two extremes. I had attempted to separate the mines by the form of the excremental track: this was, however, not entirely practicable, owing to the very imperceptible gradations, and eventually all three species came from the same mines.

5. N. NITIDELLA.

Capillis ferrugineis, penicillis et antennarum conchula luteo-albidis; alis anterioribus valde nitidis, orichalceis, post medium dilutioribus apice fuscescentibus, ciliis fusco-griseis. Exp. al. 2½ lin.

Easily distinguished by the smooth, polished disk and the pale colour of the anterior wings. The frontal tuft is bright rusty yellow, the cervical tuft and eye-caps are yellowish white; the antennæ and legs are pale gray; the middle legs hardly paler; the tarsi yellowish white. The anterior wings are very smooth, as though polished, with bright metallic gloss; their colour is a greenish brassy yellow, which is palest beyond the middle and at the tip, though to a trifling extent, and deepens at the base of the cilia to a very pale brown; the tips of the cilia are pale brownish gray, and the posterior wings with their cilia are of the same colour.

I took a beautiful fresh female at Brunswick, on the trunk of a beech tree, in May.

6. N. BASIGUTTELLA.

Capillis atris, penicillis et antennarum conchula albidis, thorace atro; alis anterioribus subnitidis, violaceo-æneis, basi flavidis, apice violaceo-purpureis, ciliis fusco-griseis. Exp. al. $2\frac{1}{6}$—$2\frac{1}{3}$ lin.

This species is very like N. Tiliæ, but larger and stouter: it is distinguished from that and from the remaining black-headed Nepticulæ which have no fasciæ by the pale basal spot of the anterior wings and the black thorax; from most of them also by the rusty yellow lower part of the face, and by the much paler silver-gray colour of the legs and the belly. The vertical tuft is black, the lower part of the face rusty yellow, or divided lengthwise by a rusty yellow line; the eye-caps are large in both sexes, and like the cervical tuft and palpi are white or yellowish white; the antennæ are shining silvery gray, thickly annulated with darker, reaching in the males along two-thirds of the costa of the anterior wings; the thorax, with the tippets, is deep black to the paler part of the metathorax, which is especially striking before the creature is pinned; the abdomen is blackish gray, with rusty yellow tip in the male; the under side of the body and the legs are pale silvery gray, the latter rather darker externally. The anterior wings have the ground colour of a very pale, almost whitish, shining bronze, but this is darkened and clouded by the more or less broad brownish violet tips of the scales. The clearest and palest part is the base, where the light ground colour forms a small, not sharply bordered, yellowish white spot, immediately beyond which the scales are most uniformly darkened; they become again gradually paler in the middle of the wing, especially at the inner margin, where, again, an undefined pale place, free from dark scales, occurs at the anal angle, which sometimes extends almost fasciaform to the costa. The apex of the wing is dark violet-blue. The disk of the wing is shining and rather smooth, but not so glossy as in N. Tiliæ. Besides the anterior wings vary not inconsiderably, according as the light ground-colour or the dark scales predominate, but the pale spot at the base is always distinct, and strongly contrasts with the dark place beyond, as also with the black thorax. The base of the cilia dark violet-blue from the apex of the wing to the anal angle; their tips are dark gray; at the anal angle and inner margin the cilia are entirely pale gray; no divisional line occurs. The posterior wings without peculiarity are pale gray, with the cilia little darker.

The larva is green, and feeds in oak leaves in July, and again in September and October. The mine forms a long track, rather tortuous, of nearly uniform breadth, entirely filled up with the dark green excrement.

This species has been noticed at Brunswick and Hanover, and Frey has also found the larva at Zurich.

Group II.

7. N. NYLANDRIELLA, *H.-S.*

Capillis ♂ fuscis, ♀ ochraceis, antennarum conchula alba; alis anterioribus nitidis, lithargyreis. Exp. al. 1¼ lin.

Herrich-Schæffer, v. 359, 1133, fig. 927.

The frontal tuft of the male is brown, that of the female pale ochreous-yellow; the antennæ are short whitish gray; the eye-caps silvery white. I cannot distinctly perceive the cervical tuft, yet it appears in the male to be more whitish, in the female pale yellow; the abdomen black-gray; the legs silvery gray. The anterior wings are very smooth, as though polished, extremely shining; their colour is pale silvery gray, with very pale and faint yellowish tinge; the apex of the wing is scarcely darker, with a very faint pale violet gloss; the cilia are whitish gray, rather darker towards their bases. The posterior wings and cilia are pale gray.

I took this insect at Brunswick, in May, very sparingly on beech-trunks, and I still possess a pair. It agrees in size and colour completely with Herrich-Schæffer's figure, and is easily distinguished from all the other species by its small size and colour.

Group III.

I have removed from this group Frey's N. æneofasciella, and on the other hand have placed here N. regiella and N. latifasciella.

All the three species have the anterior wings more or less shining, and an indistinctly margined perpendicular metallic fascia beyond the middle.

8. N. LATIFASCIELLA, *H.-S.*

Capillis atris, antennarum conchula alba; alis anterioribus dilute aureo-brunneis, nitidis, apice purpureis, fascia post medium lata, sed obsoleta dilute aurea; ciliis apice griseis. Exp. al. 1¾ lin.
Herrich-Schæffer, v. 352 (under N. gratiosella), fig. 832.

Very near to N. regiella, but distinguished by the black frontal tuft, the white cervical tuft, the rather paler, not violet-tinged, ground colour of the anterior wings, with the apex purple instead of violet or blue, and by the posterior wings being rather brown-gray than blackish gray. It also comes very near to N. aceris, but this latter has darker bronze-coloured anterior wings, and the fascia more whitish, only in certain directions with something of golden gloss, and less shining. In N. æneofasciella the fascia is bluish bronze-coloured.

The frontal tuft is coal-black; the antennæ short; the eye-caps, which are not very large, are white; the legs gray; the posterior tibiæ and tarsi whitish. The anterior wings are rather narrower than in N. regiella; up to the fascia their colour is pale golden brown or golden bronze, without the violet tinge of the former species; beyond the fascia they are violet-purple; the fascia is placed more posteriorly, is scarcely so broad, and appears rather attenuated towards the costa and inner margin; its colour is pale golden and very glossy. The disk of the anterior wings is certainly finely scaled, but not so smooth as in N. gratiosella. The cilia, as also the posterior wings and their cilia, are fuscous.

On the trunks of beech trees, at the beginning of May, near Brunswick.

Herrich-Schæffer refers N. latifasciella as a probable variety to N. gratiosella. His N. gratiosella is identical with that of Stainton. Of the different forms which Fischer-von-Röslerstamm (Linn. Ent. iii. 311, 59) introduces under this species I consider the first to be N. latifasciella, since the colour of the anterior wings and their cilia agrees with the latter. The specimens which Zeller received from Fischer are also smaller than the Metznerian specimen mentioned in Anm. i. 307, which probably belongs to N. gratiosella, *Stt.*; N. gratiosella, *F.-v.-R.*, would thus be the oldest name for N. Latifasciella, but I hesitate again to adopt it, since Fischer had included under this name a whole crowd of different species. N. gratiosella, *Stt. and H.-S.*, is larger than N. latifasciella (2⅓ lin.); the frontal tuft is deep black;

the white eye-caps are larger; the cervical tuft dark; all the legs blackish gray; the anterior wings narrow, more of a pure golden, inclining somewhat to olive-green, beyond the fascia bright violet or violet-blue; the fascia is likewise placed very posteriorly, is narrow above, distinctly margined, straight and vertical, of silvery white colour, sometimes with a very faint golden tinge; the entire surface is smooth, as though polished, and very glossy. The cilia, as also the posterior wings and their cilia, are more of a blackish gray. I have found the larva of N. gratiosella only on whitethorn hedges, but those of the other whitethorn Nepticulæ (N. regiella and N. atricollis) only in shady places in woods.

Group IV.

9. N. PRETIOSA.

Capillis ochraceis, antennarum conchula albida; alis anterioribus atro-violaceis, fascia pone basin dilute aurea, fascia post medium argentea nitida. Exp. al. 3—3¼ lin.

Distinguished by its size and beauty. The frontal tuft is brownish ochreous-yellow. The cervical tuft dark; the eye-caps silvery yellowish; the antennæ long; the legs blackish gray; the middle tibiæ with a faint pale ring. The anterior wings are deep violet-blue, almost black; near the base is a pale golden fascia, not sharply margined, whereas the base itself is dark for a slight distance; beyond the middle is a second fascia, distinctly margined, moderately broad, vertical, very shining, and silvery with a golden gloss; the cilia are blackish brown, with their tips blackish gray, shot with bluish. The posterior wings and their cilia are blackish gray.

N. æneofasciella differs in its markings in the fact that the metallic tint of the basal half of the anterior wings has a much greater extent, so that the dark colour beyond it is confined to a narrow fascia in the middle, whereas in N. pretiosa it is not the anterior fascia, but the dark space between it and the posterior fascia, which is much broader than the latter.

Herr Glitz found the larva near Hanover in the old leaves of Geum urbanum at the end of March and beginning of April. The mine is long and narrow, deeply and irregularly tortuous; the excrement forms a loose greenish stripe and leaves the edges free. The cocoon is oval, flat and slightly arched in the middle; its colour is brownish green. The imago appears at the end of April.

10. N. ÆNEOFASCIELLA, *H.-S.* (*Fr.*)

Capillis atris, antennarum conchula argentea; alis anterioribus nitidissimis aureis, basi, ante fasciam argenteam et apice purpureis aut purpureo-cyaneis, ciliis apice griseis. Exp. al. 2½—2¾ lin.

Herrich-Schæffer, v. 353, 110. *Frey, Tin.* 376, 9. *Linn. Ent.* xi. 388, 13.

Unquestionably one of the most beautiful species, recognisable by the purple or blue colour of the base and of the anterior margin of the silver fascia. The frontal tuft is deep velvety black; the rather large eye-caps are shining yellowish silvery; the antennæ in both sexes have more than half the length of the anterior wings; they are blackish, above with a yellowish white tinge; the palpi are silvery white; there is no pale cervical tuft. The thorax is shining brassy; the abdomen and the belly silvery gray; the legs externally blackish; the extreme tip of the anus is yellowish gray in the male, brownish yellow in the female. The anterior wings are long and little expanded posteriorly; the base is purple violet, often with a more or less decided blue gloss [" kornblumeblau," the blue of the corn bluebottle (*Centaurea Cyanus*)]; exactly in the middle is a vertical fascia of the same colour, but sometimes of a much brighter blue, so that the purple-brown or violet ground colour is often almost entirely covered with the blue scales, and is only visible at the inner margin; it borders the silver fascia, which it scarcely equals in width, and is sharply defined towards the base; the space between it and the base is bronzy golden, and as broad as the width of the wing in that part. The silver fascia is nearly at three-fourths of the length of the wing; it is vertical, very broad, not sharply bordered externally, and changes here gradually into brassy golden and then into the purple-violet tip of the wing, so that the commencement of the latter, according to the light in which we view it, appears either entirely brassy golden or violet. The entire disk has a metallic splendour, which is very decided on the golden ground, and on the silvery fascia. The cilia are purple violet at their bases, brownish in the middle, with faint golden gloss; at the tips they are pale blackish gray. The latter colour is also that of the posterior wings and their cilia, as also of the under side of all the wings, though with rather a darker shade.

This species, which we at first took for new, since it did not agree with Frey's description, is, according to a written communication of the latter, the correct N. æneofasciella, since his description was made from a pale captured specimen. The larva lives in October in the leaves of Agrimonia Eupatoria, and makes strongly contorted mines with slender excremental tracks, which can hardly be distinguished from the mines of N. Agrimoniella, but it changes to pupa outside the mine in an almost circular yellowish brown cocoon.

Near Frankfort-on-the-Maine, Zurich and Wolfenbuttel.

11. N. FRAGARIELLA, *Heyd.*

Capillis fuscis, antennarum conchula argentea; alis anterioribus basi late viridi-æneis, ante et post fasciam latam dilute auream purpureo-fuscis, ciliis fuscis, apice griseis. Exp. al. 2—2⅓ lin.

Von Heyden in litt.

Frontal tuft brown, blackish in the middle, passing into gray at the sides and in front; the eye-caps small, rather larger in the male, greenish white with metallic gloss; the antennæ are in both sexes more than half the length of the anterior wings, blackish; the palpi white. I do not perceive that the cervical tuft is pale. The entire body is shining greenish bronze, likewise the legs, only they are darker; the anus of the male has two small pale gray tufts. The anterior wings are narrow and elongate, of nearly uniform width, very shining greenish brassy to beyond the first third of the wing; the remainder to the apex is of a rather pale brown, inclining somewhat to purple or violet-brown, more rarely to violet-blue, which before the metallic fascia appears as an equally broad fascia, distinct towards the base, though not sharply bordered. The metallic fascia is vertical at two-thirds of the length of the wing; it is rather broad, pale golden and very shining. The cilia have, at their bases, brown, somewhat violet scales, but these are not sharply defined; at their tips they are pale gray, and this is also the colour of the posterior wings and their cilia. Beneath all the wings are pale fuscous.

This species has perhaps some resemblance with N. splendidissima, but can easily be distinguished from it. The latter has the frontal tuft deep black, the eye-caps larger, and the colour of the broader anterior wings beyond the brassy basal portion is quite different, golden brown with a strong violet tint, often almost entirely deep violet-blue, and not distinctly margined towards the pale base, but shading gradually into it; besides the metallic fascia is nearer the base on the costa and perceptibly oblique.

The larva feeds in July, and again at the end of September and beginning of October on strawberry leaves; it is pale amber-yellow with the head brownish, and makes long, narrow, tortuous mines, with a rather slender excremental line. The cocoon is rather broad and flat, of a brownish yellow colour.

Found at Frankfort-on-the-Maine by Herr von Heyden, and last year it was also noticed at Wolfenbuttel.

Group V.

12. N. Ulmivora, *Fr.*

Capillis atris, antennarum conchula alba; alis anterioribus nitidis, viridi-aureis, in margine anteriore cupreis, apice violaceo-fuscis, fascia postica late argentea, nitidissima, ciliis apice cinereis. Exp. al. $1\frac{3}{4}$ lin.

This species, named by Frey, who forwarded me a specimen, is very like N. gratiosella, but is distinguished by the bright coppery colour of the costa of the anterior wings, by the pale gray cilia and hind wings, and by the whitish gray middle tibiæ, and from the remaining black-headed species of this group it is further distinguished in the silver fascia not being bordered with dark towards the base. The frontal tuft is black; the eye-caps pure white. I cannot perceive a pale cervical tuft. The legs are blackish gray; the middle tibiæ are whitish gray; the middle tarsi and the tips of the posterior tarsi are white. The anterior wings are narrow, of nearly uniform breadth, in colour similar to N. gratiosella, but paler greenish bronze with reddish golden tinge and considerable glossiness; on the costa they are purple-violet, especially before the fascia, beyond which pale brown to the base of the cilia, with a faint violet tinge. The fascia is rather posteriorly placed, somewhat oblique; it is broad, silvery, with faint golden gloss and highly metallic. The cilia are gray, with their tips and at the anal angle more whitish. Posterior wings pale gray. Frey writes me that the specimen sent was paler, and on the costa of a less brilliant coppery red than his other specimens.

According to Frey's communication the larva is green, and mines circular and visceriform tracks in Ulmus campestris at Frankfort-on-the-Maine.

13. N. speciosa.

Capillis nigris, antennarum conchula magna albida; alis anterioribus nitidis, rufo-aureis, medio purpureo-tinctis, apice atro-cæruleis, fascia post medium aurea, nitida, ciliis apice fuscis; tibiis mediis æneo-griseis. Exp. al. 2½ lin.

Frey, Intellig. iv. 27.

Extremely like N. marginicolella, ♂; of the same size and form, and of quite similar colours and markings, with only this difference, that the cilia of the anterior wings, as well as the posterior wings and their cilia, are not blackish but more brownish, the eye-caps are larger and of a purer white; besides, the middle tibiæ are not whitish as in N. marginicolella, but gray with a bronzy gloss like the other legs. On the hind margin of the posterior wings in the male of N. speciosa there is a row of shorter cilia on the other cilia, but these are finer than in N. marginicolella, and only noticeable in that the basal half of the cilia appears thicker. I have not been able to find out other differences. The ground colour of the anterior wings is of a shining reddish golden with faint violet gloss, which becomes violet-blue before the fascia. The fascia is placed just beyond the middle; it is vertical, pale golden, very glossy, the space beyond it is dark brown with violet-blue gloss. If one looks obliquely along the wings towards the base, and towards the light, the golden gloss on the ground colour and on the fascia disappears, and the ground colour from the base to the distinctly and sharply-defined dark portion before the fascia appears of a shining greenish brassy, and the fascia itself appears pure silvery; the same thing also occurs in N. marginicolella. Whether the female has, like N. marginicolella, a reddish yellow frontal tuft I know not, since I only possess a male.

The larva feeds in a large mine at the end of September and beginning of October, in the leaves of Acer pseudo-platanus. Frey bred it at Zurich, and sent me the specimen described. I have also found the empty mines at Brunswick.

I am still doubtful whether two specimens which Buchheister took the beginning of May at Wolfenbuttel, on Acer pseudo-platanus, should be referred here. They are much less shining, especially the base of the anterior wings is rather dull, since violet or purple-blue scales, though only faint, go to near the base, and the latter lightens up somewhat metallic; the ground colour is more bronzy green, with violet tint; the fascia broader, with fainter glossiness, and the entire insect is more like N. splendidissimella than N. marginicolella.

Group VI.

14. N. ALNETELLA, *Stt.*

Capillis ferrugineis, antennarum conchula flavida; alis anterioribus subnitidis, violaceo-aureis, apice nigro-cæruleis, fascia post medium recta, lata, dilute aurea, nitida, ciliis apice obscure griseis. Exp. al. 2—2⅓ lin.

Stainton, Ann. 1856, 43; *Man.* ii. 437. *Frey, Linn. Ent.* xi. 457, 52.

This and the two following species follow after the last species of the preceding group, but are distinguished by the less shining and not polished ground of the anterior wings. These in all are rather broad, perceptibly dilated and rounded posteriorly; the fascia is nearly vertical, rather beyond the middle of the wing, has straight margins and is highly metallic; the ground colour is darkened before it for a greater or less extent, but only very slightly and scarcely perceptibly in N. alnetella; the apex of the wing is likewise dark to the fascia. The frontal tuft is bright ferruginous; the small cervical tuft ochreous-yellow; the eyecaps yellowish white; the antennæ short.

The anterior wings of N. alnetella are pale golden brown, not very glossy, darkened with a violet tinge, which is rather more intense towards the fascia, and to which it sometimes forms a narrow dark margin. The fascia is broad, sometimes as broad as the thorax, sometimes about one-half narrower; its colour is pale golden; it is scarcely so glossy as in the following species; beyond it the ground colour is blue-black or blackish with blue, not violet glitter, not shining; the base of the cilia is also clothed with blue-black scales, which are rather regularly edged; beyond them the cilia are darker gray. The posterior wings and their cilia are rather paler gray. Beneath all the wings are fuscous; the anterior darker; the abdomen has somewhat of a greenish bronzy tint; the legs are blackish; the middle tibiæ scarcely paler.

Of the species of the preceding group only N. aurella and the male of N. marginicolella can be confused with N. alnetella, from the ferruginous colour of the frontal tuft. But in both these the anterior wings before the fascia are much more shining, smooth, and without a violet tinge; beyond the fascia they are dark purple-brown and not blue; besides, N. aurella has narrower and longer anterior wings, and in N. marginicolella the fascia is pure silvery. N. dulcella and N. continuella have still less glossiness on the surface of the wings, and the fascia is narrower, purer silver and more shining, and with a distinct and broader fascia before it, and the space beyond it violet-black; the middle tibiæ are also whitish. In N. ignobilella the anterior wings are narrower and longer, paler, the fascia stands further beyond the middle, and is less golden; the apex is violet. With the other species of this group any confusion is not so easy, since in them the apex of the anterior wings differs less in colour and glossiness from the basal half.

Stainton's statements do not agree with the two specimens which I possess, in that he says "fascia extremely brilliant," and calls the colour of the tip of the wing "dark purple, almost black." According to the account of the larva I can have no doubt but that my species is identical with his.

The pale amber-yellow larva feeds at the beginning of July and end of September on the leaves of Alnus glutinosa; the mine is long and narrow, tortuous, entirely filled up with dark excrement.

Found in England, also near Brunswick and near Zurich.

15. N. DULCELLA.

Capillis ferrugineis, antennarum conchula luteo-alba; alis anterioribus dimidio basali olivaceo-æneis, subnitidis, postice atro-purpureis, fascia post medium recta, argentea nitidissima, ciliis apice griseis. Exp. al. 2⅓ lin.

Very like N. continuella. I can only find a difference in the paler colour of the anterior wings, and in the narrower dark fascia which precedes the silvery fascia being more obsolete towards the base. The anterior wings are pale olive-bronze from the base, rather glossy; they become gradually darker towards the silvery fascia, and before it become for an undecided extent dark brown, with faint purple-violet gloss; this is also the colour of the space between the fascia and the apex. The protruding scales in the cilia are dark violet; they lie in two rather regular rows, of which the outer one is the paler; the tips of the cilia are gray. The posterior wings are rather paler than in N. continuella.

I have a pair bred from mines in strawberry leaves, which I could not distinguish from the mines of N. fragariella. The male I sent to Frey, who refers it to N. fragariella, remarking that the two sexes of that species differ considerably. I have myself received N. fragariella from Heyden. It is the species already described, and of which I and Buchheister have bred both sexes of quite similar specimens; likewise of N. dulcella I have bred both sexes, which also agreed precisely, only that the male, as far as I remember, had more the colour of N.

marginicolella, ♀. Moreover all the specimens of N. fragariella appeared in the warm room in January, whereas those of N. dulcella do not appear till March, simultaneously with N. augulifasciella; hence I believe I must decidedly recognise in this a new species.

16. N. CONTINUELLA, *Stt.*

Capillis ferrugineis, antennarum conchula luteo-alba; alis anterioribus violaceo-atris, basi obscure æneis, vix nitidis, fascia post medium recta, argentea, nitidissima, ciliis apice obscure griseis. Exp. al. 2⅓—2½ lin.

Stainton, Ann. 1856, 42; *Man.* ii. 437. *Frey, Linn. Ent.* xi. 436, 51.

The frontal tuft is rusty yellow or ochreous-yellow; the cervical tuft paler; the eye-caps, which are larger in the male, white, inclining rather to ochreous-yellow; the abdomen and legs blackish; the middle tibiæ and tarsi whitish. The anterior wings are dull olive-bronze at the base, sometimes with a faint violet tinge on the costa, but very slightly shining; before and beyond the silver fascia they are black-brown, inclining to purple-violet, not glossy; thereby is formed before the fascia a more or less broad dark band, not sharply edged, but yet rather distinctly defined. The silver fascia is just beyond the middle, vertical, rather narrow and very glossy; frequently it has a faint golden tinge. Violet-black scales project at the base of the cilia, which at the anal angle are more defined; between them the cilia are fuscous, with the tips purer and paler gray. The posterior wings and their cilia are darker gray.

A female bred along with N. continuella differs in some respects. The anterior wings are narrower, of more uniform width, the fascia is placed more posteriorly and is perceptibly broader; the basal half of the wing is dull golden brown, with a violet tinge, only a little darker towards the fascia; the cilia have their bases darkened for a greater extent; the middle tibiæ are scarcely paler than the other legs; the antennæ also seem to be longer, and the eye-caps of a darker yellowish. Whether this indicates a new species will be seen hereafter.

The larva is green, and feeds in birch leaves; the mine is long and narrow, tortuous, entirely filled up with dark green excrement. The cocoon is oval, flat, of a yellowish brown or pale olive-green.

In England and near Brunswick; the larva at the end of September and beginning of October.

17. N. INÆQUALIS.

Capillis atris, antennarum conchula nivea; alis anterioribus angustis, fusco-nigris, parum cæruleo-micantibus, fascia valde post medium dilute aurea, nitida, ciliis obscure violaceis, apice griseis. Exp. al. 2 lin.

This species is easily recognised by the black head, the narrow, elongate anterior wings, throughout uniformly dark, and the pale golden fascia placed unusually posteriorly. The frontal tuft is black; the cervical tuft and eye-caps white; the antennæ blackish gray; in the female shorter than the half of the anterior wings; the abdomen metallic blackish gray; the legs black, with the tips of the tarsi whitish. The anterior wings are extraordinarily long and narrow, scarcely dilated posteriorly, of a uniform dark brown, with a faint bluish tinge, scarcely shining; the fascia is placed at three-fourths of the length of the anterior wings; it is vertical, rather broad, pale golden, very glossy. The violet-brown base of the cilia is well defined; the tips, as well as the posterior wings are fuscous. The under side is fuscous; the fascia of the anterior wings is indicated by the paler colour, especially on the inner margin.

The larva feeds in strawberry leaves, and was collected along with that of N. fragariella in October, without any difference being observed in it or its mine. The cocoon is also similar, rather broad and flat, of a brownish yellow colour. Buchheister bred two females of the species from larvæ found in chalky places near Wolfenbuttel.

18. N. BETULICOLA, *Stt.*

Capillis luteis (♂), aut ochraceis (♀), antennis brevioribus, conchula flavida; alis anterioribus, apice rotundatis, æneo-nigris, postice violaceis, subnitidis, fascia valde postica, subrecta, albida, dilute aureo-nitida, ciliis apice cinereis. Exp. al. 1½—2¼ lin.

Stainton, *Ann.* 1856, 42; *Man.* ii. 436; *Nat. Hist.* i. 26, under Betula alba, No. 2 (larva and mine). *Frey*, *Tin.* 387, 24; *Linn. Ent.* xi. 424, 42.

Frey had only one female before him, and an additional description seems the less superfluous, since the male differs in some specimens, and Frey's statements do not perfectly accord with those of Stainton. In the male the frontal tuft is pale luteous-yellow, sometimes almost dirty white, the small cervical tuft still paler, the eye-caps small and silvery white; in the female the frontal tuft is bright ochreous-yellow, the cervical tuft luteous, the larger eye-caps are pale yellow, with a silvery gloss. The antennæ in both sexes have less than half the length of the anterior wings; they are blackish; the abdomen is black-gray, with metallic lustre; the legs are blackish, in certain directions with a silvery gray lustre; the middle tibiæ and tarsi, as also the ends of the posterior tarsi, are whitish. The anterior wings are proportionally broad, rounded at the tip, though this form is rather variable; the ground colour is not, as Frey says, black with a violet gloss, but a mixture of bronze and blackish gray, rather smooth, with tolerably decided metallic lustre; beyond the fascia it is violet, more rarely blue. The fascia itself is very posteriorly placed, at more than two-thirds of the length of the wing, scarcely oblique; it is rather narrow, of uniform width, distinctly but not sharply outlined, white with a silvery gloss, sometimes inclining to golden, especially in the female. The cilia are violet-gray at their bases, with the tips whitish gray; at the anal angle they are rather darker. The posterior wings and their cilia are gray. Beneath all the wings are fuscous, the anterior rather the darker.

This species is most nearly allied to N. plagicolella, and is sometimes very difficult to distinguish from it, but the latter has the frontal tuft much brighter ferruginous and the antennæ are longer, reaching in the female to the middle of the anterior wings, and in the male perceptibly beyond the middle; besides, in N. plagicolella the ground colour of the anterior wings is more bronze, paler and more glossy, and not so inclined to black-gray; before the fascia there is a more decided violet tinge; the base, on the other hand, is always rather paler dull bronze-colour; the fascia is close beyond the middle of the wing, rarely as narrow as in N. betulicola, and has a more decided metallic lustre; the cilia are decidedly of a darker gray. Moreover in N. plagicolella the middle tibiæ are not paler than the other legs. N. microtheriella may be distinguished by the narrower anterior wings suffused with violet, and before the tip almost of a pure blue, by the narrow rather oblique fascia, and by the darker gray cilia. N. luteella has the disk of the anterior wings less smooth and dull, the fascia is not placed so posteriorly, and perceptibly expands on the inner margin, inclining to yellowish with very slight glossiness.

The amber-yellow larva with green dorsal vessel feeds in July, as also at the end of September and beginning of October, in the leaves of Betula alba; I counted twenty-five specimens in one leaf. The mine is rather broad, tortuous, with a loose excremental track in the middle. The cocoon is yellowish brown, flat, generally rather broader at one end.

Besides occurring in England this has been observed at Zurich, Brunswick and Hanover.

Group VII.

19. N. POTERII, *Stt.*

Capillis sordide ochraceis, antennarum conchula parva, flavido-alba; alis anterioribus subnitidis, aureo-olivaceis, apice violaceis, fascia postica lata, dilute aurea, nitida, ciliis apice griseis. Exp. al. 1½ lin.

Stainton, Ann. 1858; *Man.* ii. 435.

Allied to N. ignobilella, but smaller; the frontal tuft dirtier yellow; the eye-caps very small, yellowish white; the middle tibiæ scarcely paler than the remaining legs, which are of a rather pale gray. The anterior wings are narrow, pale olive-coloured as far as the fascia, with golden gloss; the tip of the wing is pale violet-blue. The vertical fascia is placed very posteriorly; it is broad, pale golden, with something of a greenish tinge, and less brilliantly metallic. The tips of the cilia and the posterior wings are pale gray. From the other species of this group this may be known by the golden fascia.

The larva (according to Stainton) is yellow, and feeds in June on the leaves of Poterium sanguisorba in mines, at first slender and then blotch-like. The imago in July.

Hitherto only observed in England.

20. N. DISTINGUENDA.

Capillis ochraceis, antennis maris longioribus, conchula flavida; alis anterioribus angustis, olivaceo-fuscis, apice vix violaceis subopacis, fascia postica suberecta, albida, subnitida, ciliis apice griseis. Exp. al. (♂) 2½ lin., (♀) 1½ lin.

Although I only possess a pair of this species I do not hesitate to describe it as new, since it differs decidedly from all the other species. It is closely allied to N. betulicola and also to N. glutinosæ; it is larger than the former. The frontal tuft, eye-cap and cervical tuft, and also the legs, are as in N. betulicola, but the blackish antennæ are longer in the male, since they reach perceptibly beyond the middle of the anterior wings to the fascia, but yet they are shorter than in N. glutinosæ, in which species they have full two-thirds of the length of the anterior wings and reach to beyond the fascia. The abdomen is blackish. The anterior wings are elongate, narrower and not so rounded as in N. betulicola, more of the same form as in N. glutinosæ, which they also resemble in their slight glossiness. The surface is not so smooth; indeed the individual scales may be distinctly perceived with a lens; their bases are olive-bronze; their tips dark brown, with quite a faint bluish tinge, and to the naked eye the surface appears of a unicolorous olive-brown. The fascia does not appear to be quite so posteriorly placed as in N. betulicola, and is vertical; it is at the same time rather narrow, of uniform width, inclining to yellowish, but perceptibly less glossy. Beyond it the surface is darker, with a very faint violet-blue tint, which also prevails at the base of the cilia, whereas their tips are rather dark gray. The posterior wings and their cilia are gray, slightly inclining to brownish. In the much smaller female which I refer here the antennæ are short, the anterior wings a little more bronze-coloured, and the fascia is broader, hence appears to be nearer the base.

This species is further distinguished from N. glutinosæ and N. microtheriella by the ground colour not being so blue, especially at the tip of the wing, and by the paler, more brownish colour of the posterior wings and their cilia. From the former it also differs by the broader and more glossy fascia, from the latter by the longer antennæ of the male, by the rather duller fascia being throughout of uniform width. N. luteella has the antennæ and anterior wings shorter, the tip of the latter of a bright violet-blue; the fascia is nearer the base, close beyond the middle, more inclining to luteous, and is ill defined, especially towards the costa, and not metallic. N. turicella has the ground colour of the anterior wings more of an olive-gray, with a dull white, distinctly oblique fascia, edged with dark towards the base, and posteriorly rather concave; it has also paler cilia and shorter whitish antennæ. There are specimens of N. malella in which the anterior wings are of the same colour as in N. distinguenda, but that species is readily distinguished by the more brilliant fascia being placed nearer the base, and by the distinct cilial line.

I once bred both sexes from birch leaves at the same time, before I was acquainted with N. betulicola and N. luteella, and at that time had not examined the larva and mine sufficiently. Last autumn I found a single larva in a birch leaf, which appeared to me distinct from the larvæ of the remaining birch Nepticulæ, but hitherto it has not produced an imago. It may belong to N. distinguenda. This larva was wax-yellow, the mine tortuous, quite filled up with dark excrement.

Brunswick.

21. N. GLUTINOSÆ, *Stt.*

Capillis ochraceis, antennis maris longis, conchula flavida; alis anterioribus angustis, olivaceis, violaceo-tinctis, apice violaceo, aut totis nigro-cæruleis, fascia postica angusta, luteo-alba, parum nitida; ciliis apice griseis. Exp. al. 2—2½ lin.

Stainton, Man. ii. 436.

This species is closely allied to N. distinguenda and to N. microtheriella. The differences between it and the first-named species have been already given: the points of difference between it and N. microtheriella consist in the rather larger size, the less smooth surface of the anterior wings, and their being tinged more with violet and not with so pure a blue; also by the very narrow fascia, not so purely silvery and less shining; and finally by the longer antennæ. Those specimens of N. glutinosæ which have little of the violet tinge are still more closely allied with N. turicella, but the latter has the frontal tuft paler, the antennæ white or silvery gray to the tips, the surface of the anterior wings is rather smoother, their tip is not so blue, more of a violet-brown, the fascia is whitish with a faint silky lustre; it is placed rather obliquely, and generally expands on the inner margin towards the base, or this expansion is at least indicated from the fascia near the inner margin being rather broken towards the base; the dark margin on the basal side of it is more pronounced. Besides, the legs in N. turicella are paler, especially the anterior legs and femora are whitish gray, whereas in N. glutinosæ these are blackish. The frontal tuft is of a more or less bright ochreous, sometimes almost luteous; the cervical tuft and the eye-caps are whitish, with a slight inclination to yellow; the blackish antennæ in the male reach beyond the fascia, in the female beyond the middle of the costa; their basal half is sometimes whitish. The abdomen and legs are blackish, the former whitish gray beneath; the middle tibiæ and the ends of the posterior tarsi are whitish. The ground of the rather elongate, finely-scaled anterior wings is dull silky olivaceous, as in N. turicella, suffused more or less with violet or blue, sometimes so slightly that the ground colour remains almost quite unsullied as far as the fascia, or at most there is only a faint and ill-defined violet-brown border before the fascia; but sometimes, and especially in the females, the surface is uniformly suffused with blue up to the fascia, either in such a way that the ground colour still remains distinctly visible or so that the entire surface is dark blue, indeed even black-blue, but without this blue colouring being very bright. The fascia is placed rather posteriorly, vertical or only slightly oblique; it is narrow, sometimes very narrow, throughout of uniform width, not very sharply defined; its colour is whitish, with a faint yellowish silvery gloss; in all specimens the tip of the wing is dark violet-blue or black-blue, likewise the bases of the cilia, which then become dark gray, with their tips paler. The posterior wings and their cilia are pale blackish gray.

The wax-yellow larva feeds in July, and again at the end of September and beginning of October, in the leaves of Alnus glutinosa; the mine is serpentine, with a loose excremental track in the middle; the cocoon is of a broad oval form, rather arched, with flat margins; the colour is rusty brown.

In England, and at Brunswick and Wolfenbuttel.

Group VIII.

22. N. LUTEELLA, *Stt.*

Capillis luteis aut fuscis, antennis brevioribus, conchula albida; alis anterioribus obscure olivaceis, apice violaceo-tinctis, fascia post medium luteo-albida, parum nitida, antice evanescente, ciliis apice pallide griseis. Exp. al. 1¾—2 lin.

Stainton, Ann. 1857; *Man.* ii. 434.

This species may be known by the ill-defined yellowish fascia, which is less distinct towards the costa, or at least attenuated there. The frontal tuft is generally pale ochreous or luteous, often mixed with gray, more rarely entirely black-brown; the cervical tuft and the large eye-caps whitish; the antennæ of the male have half the length of the anterior wings; those of the female are rather shorter, they are blackish gray; the abdomen and legs are of the same colour, only the tarsi and middle tibiæ are whitish. The anterior wings are rather short; their ground colour is similar to that of N. turicella, but from the coarser scaling they appear uniformly darker up to the pale fascia, which has no dark border on its basal side; beyond the fascia the wings are dark brown, with more or less of violet, rarely with a bright violet-blue gloss. The fascia is placed rather beyond the middle of the wing; it is not sharply defined, broad on the inner margin, it becomes attenuated and often obsolete towards the costa; its colour is whitish, with a dash of olive-yellow; it is rather more shining than the adjoining surface, but the glossiness is ill defined and varies according to the light; it varies in breadth and distinctness, so that sometimes it only appears as a pale, rather more shining part of the ground colour. Beyond the violet scales the cilia are fuscous, with the tips paler. The posterior wings and their cilia are gray. The under side of all the wings is fuscous; the anterior have a feeble bluish gloss, with the apex darker.

N. luteella differs from N. glutinosæ, as also from N. turicella, by the shorter antennæ and wings, the larger and whiter eye-caps, the forms of the fascia, partly also by the want of the dark bordering of the fascia towards the base. Besides N. glutinosæ has more blue on the disk, especially beyond the fascia, and the fascia is narrow, more defined and not expanded on the inner margin, and before the fascia the anterior wings are irrorated with dark violet. The differences between this species and N. betulicola and N. distinguenda are mentioned under these latter.

The larva is pale green, with darker dorsal line, and feeds in July and October in birch leaves. The mine is long, slightly tortuous, generally abruptly angulated; the excremental line is slender. The cocoon is small and flat, buff-coloured.

Besides occurring in England, this has been observed at Brunswick, Wolfenbüttel and Hanover.

Group IX.

23. N. TURICELLA.

Capillis pallide ochraceis, antennis maris longioribus, conchula albida; alis anterioribus griseo-olivaceis, medio et apice fuscis, violaceo tinctis, fascia obliqua, albida, sericeo micante, ciliis apice griseis. Exp. al. 2—2⅓ lin.

Herrich-Schäffer, v. 355, 1118.

N. turicensis, *Frey*, *Tin*. 391, 30. *L. E.* 413, 34.

N. lemniscella, *Zeller*, *L. E.* iii. 313, 4. (The two specimens from Zeller's collection).

Since both Herrich-Schæffer's and Frey's descriptions were made from captured specimens, I amplify them from a series of bred specimens. The frontal tuft is pale ochraceous, the cervical tuft whitish; the small eye-caps and antennæ whitish; in the male the latter have nearly two-thirds of the length of the anterior wings, in the female nearly the half. The abdomen and the hind legs are blackish gray, only the middle legs and tarsi are whitish; the anterior legs are pale gray. The ground colour of the anterior wings is olivaceous, rather inclining to gray, sometimes nearly olive-black, not brownish yellow, as Frey says, and not pale brassy yellow, as Herrich-Schæffer says;

the surface is certainly finely scaled, but not polished and very little shining; the fascia, which is not broad, stands perceptibly beyond the middle and is rather oblique; its posterior edge is generally somewhat concave, whence on the margins it appears rather broader, especially on the inner margin; its colour is whitish, and it has a dull silky gloss; towards the base it is bordered by a dark brown stripe, with a faint violet gloss, and the entire tip of the wing, as well as the base of the cilia, is of the same colour. The cilia are darker gray in the middle, paler gray at the tips. The posterior wings and their cilia are gray.

The larva is very like that of N. tityrella, and feeds in beech leaves simultaneously with it. The mine is also similar, but long, and its tortuosities are not so close to one another. The cocoon is longish, much arched, and of an ochreous-yellow.

Zeller has (*l. c.*) mixed N. turicella with N. tityrella, and described them under the name of N. lemniscella. The two specimens from Metzner belong to N. tityrella, as is manifest from the distinct cilial line; the two specimens from Glogau are N. turicella. That this is so is also evident from the fact that Zeller formerly named for me as N. lemniscella dark specimens of N. turicella as well as specimens of N. tityrella. Paler specimens of N. turicella he pronounced to be N. hemargyrella. But, on the other hand, I consider this latter to be a good species, which I formerly often took on the trunks of beech trees, but which I have never bred along with N. turicella, and I refer to it Herrich-Schæffer's fig. 816. I describe it as follows:—

24. N. HEMARGYRELLA, *Zell.*

Capillis dilute ochraceis, antennis maris longioribus, conchula alba; alis anterioribus flavido-albis, nitidis, apice fuscis, fascia post medium lata, subrecta, subargentea, basin versus linea subfusca terminata, ciliis apice late albidis. Exp. al. 2—2¼ lin.

Zeller, L. E. iii. 323, 9.

N. ignobiliella, *Herrich-Schæffer*, fig. 816.

Of the form of N. turicella, but altogether paler and more glossy. The frontal tuft is pale ochreous-yellow, the cervical tuft and the small eye-caps white; the antennæ of the male have two-thirds of the length of the anterior wings; those of the female are shorter; they are silvery gray. The anterior wings are white, slightly inclining to yellow, with the base sometimes clouded with olivaceous; they are smooth, with considerably silky gloss, with a narrow brownish line at the fascia, not sharply expressed and sometimes slightly interrupted. The fascia, placed a little beyond the middle of the wing, is rather oblique, broad, only distinguished from the ground colour by the intermediate dark line, its purer white colour and greater glossiness; the space beyond it is paler or darker brown, with a faint yellowish gloss. The cilia are at their bases narrowly pale fuscous, then broadly whitish; they are also whitish on the costa before the apex, whereas here in N. turicella they are dark. The posterior wings and their cilia are whitish gray, rather inclining to yellowish; the abdomen is pale yellowish gray, with the legs whitish.

Herrich-Schæffer's fig. 816 agrees thoroughly, only the basal half of the anterior wings, as well as the tip, is too dark.

Near Brunswick; scarce on the trunks of beech trees in May.

Group XI.

The five species with coarsely-scaled anterior wings, and, with a distinct divisional line in the cilia, and with a metallic fascia in the middle of the anterior wings, are extremely difficult to distinguish. They are N. Agrimoniella, N. atricollis, N. angulifasciella, N. Rubivora and N. arcuatella: we have bred them all, and, excepting the last named, in numbers, and we have found that in the form of the fascia, on which authors have laid special stress, they are more or less variable, and that therefore this character is only of secondary importance in distinguishing the species. All have the anterior wings, which are more or less coarsely-scaled, similar in form, dilating considerably towards the hind margin, blackish, sometimes inclining a little to gray (N. Agrimoniella, male, and N. arcuata). The fascia is moderately broad or narrow, and has considerable silvery lustre; in general it runs from the middle of the costa rather obliquely towards the inner margin, is refracted above the inner margin, which it reaches in, or a little beyond, the middle; in N. Agrimoniella, and often also in the other species, it is refracted in the middle of the wing, or only slightly curved; at other times it goes in rather an oblique direction to the inner margin. Apparently this fascia consists of two spots, one in the middle of the costa, the other rather posterior on the inner margin; both have a rather oblique direction posteriorly, and generally meet at an angle, yet often they remain distinctly separated; the longer the costal spot is in proportion to the dorsal spot, the nearer to the inner margin is the angulation of the fascia, and then the dorsal spot is generally the more posteriorly placed. If the fascia be angulated or curved in the middle, as in N. Agrimoniella, both spots are then generally placed precisely in the middle of the margins, and this form then passes into that in which the fascia is vertical on the inner margin; on the other hand, if the costal spot stretches to the inner margin, the dorsal spot is then almost entirely dropped, and forms only a slight extension of the oblique fascia towards the base. The cilia beyond the divisional line are pale, only of a darker gray at the anal angle. The posterior wings are pale gray, with darker gray cilia. The under side is of a paler or darker black-gray, rather paler on the posterior wings. The colour of the frontal tuft appears constant in N. angulifasciella, N. Rnbivora and N. atricollis; in N. Agrimoniella it varies from rusty yellow to dark brown, and in N. arcuata from luteous or rusty yellow to blackish gray, and certainly the males have generally the pale yellow colouring, and the females the dark brown or gray tint. The cervical tuft is dark. The antennæ are rather short (longer in N. Agrimoniella and N. arcuatella), blackish, more rarely pale gray; the abdomen and the legs are blackish, the femora and middle tarsi often paler, but not the middle tarsi; the hind tarsi at the extreme tip pale (in N. arcuata this pale colour extends to the first joint). The cocoons are oval, flat and black; that of N. Agrimoniella is lilac. The larvæ all live in the leaves of Rosaceæ at the end of September and beginning of October, appearing probably only once a year in the imago state in June. N. atricollis alone is double-brooded.

25. N. AGRIMONIELLA, *H.-S.*

Capillis ferrugineis aut fuscis, antennarum conchula flavida; alis anterioribus postice valde dilatatis, grosse squamatis, nigris fascia media argentea, nitida; ciliis post lineam nigram albidis; tarsis posticis nigris, apice lutescentibus. Exp. al. 2—2½ lin.

Herrich-Schæffer, Corresp. Blatt. 1860, p. 60, No. 3. *Neue Schmett.* 169.

This species is distinguished from the rest by the peculiar form of the anterior wings, which are extraordinarily dilated by the longer cilia at the anal angle, being directed more posteriorly; this is especially conspicuous in the male, where the anterior wings gradually increase in breadth from the base; generally in the female this form is not so decided, but the wings are more suddenly dilated beyond the middle. The frontal tuft in the male is generally rusty yellow, at the neck brownish; in the female generally dark brown, yet males do occur with brown heads and females with ferruginous heads. The eye-caps are small, whitish, more or less inclining to yellow; the antennæ long. The anterior wings are more coarsely scaled than in the other species, the male has the scales black-gray, with black tips; in the female they are pure black; the fascia is equidistant from the base on the costa and inner margin, obtusely angulated or curved in the middle, sometimes almost straight and vertical, rarely with a slight interruption in the middle, and then composed of two silvery spots of equal size. In the male it has a dull slightly golden metallic lustre; in the female this is more decided. The cilial line forms a large (in the female often depressed) curve round the apex of the wing, running to the anal angle; before it the cilia are gray, with black tips to the scales, which form a second divisional line, sometimes only perceptible at the anal angle, but sometimes extending distinctly to the costa.

The male may be distinguished from the other species, independently of the form of the wings, by the paler, grayer colour of the anterior wings, and from N. arcuata, which is also gray, by the darker hind tarsi; the female may be generally recognised by the brown frontal tuft. Besides, in the other species the fascia goes rather obliquely from the costa to beyond the middle, is generally refracted below the middle, and is further from the base on the inner margin than on the costa. From N. atricollis, which sometimes has the fascia almost of the same form, the longer antennæ will distinguish it.

The larva is greenish yellow, with brownish head and brownish spots on the second segment. It feeds in the leaves of Agrimonia Eupatoria, sometimes very abundantly, in a long tortuous mine, with slender excremental track, and changes to a pupa *inside the leaf*, in a violet-coloured cocoon.

At Ratisbon, Frankfort-on-the-Maine, and at Wolfenbuttel; not scarce in the last-named locality.

26. N. ATRICOLLIS, *Stt.*

Capillis læte ferrugineis, alis anterioribus postice latioribus, grossiuscule squamatis, nigris, fascia media subobliqua interdum interrupta argentea, nitida, ciliis post lineam nigram albidis; tarsis posticis nigris, apice pallidis. Exp. al. 2 lin.

Stainton, Ann. 1857; *Man.* ii. 435.

? N. argyrostigma, *Frey, Tin. d. Schweiz,* 379, 13. *Lin. Ent.* xi. 394, 18. (The specimen from Baumgarten.)

In the form of the anterior wings this approximates to the preceding species, since they are dilated in the same way, though not nearly to the same extent. The frontal tuft is bright rusty yellow; the eye-caps are rather large silvery white; the antennæ rather short; the middle legs pale. The anterior wings are deep black, not quite so coarsely scaled as in N. Agrimoniella; the fascia is silvery white, with considerable metallic lustre; it is angulated on the fold, but often the costal portion is abbreviated, and thus it is split into two small oblique spots, one of which is on the middle of the costa, the other a little beyond the middle of the inner margin. The cilial line also runs in a curve round the apex of the wing, but is rather more oblique above the anal angle; before it the cilia are blackish gray, with dark tips to the scales (not, however, forming a second divisional line); beyond it they are shining whitish.

From N. angulifasciella and N. Rubivora this is distinguished by the rusty yellow frontal tuft; from N. arcuatella the purer white tips of the cilia and the distinct cilial line, as also the darker hinder tarsi, serve to distinguish it.

Here, it appears to me, should be referred the red-headed specimen of Frey's N. argyrostigma, whilst I would refer the two specimens with black-brown frontal tuft to N. Rubivora.

The larva is double-brooded, occurring in the leaves of wild apple trees and whitethorn, in shady parts of woods; it forms a blotch-like expanded mine, very similar to those of N. gratiosella and N. regiella. It is yellow, with the head and spot on the second segment blackish.

England, and in Germany at Wolfenbuttel.

27. N. ANGULIFASCIELLA, *Stt.*

Capillis luteis, antennarum conchula albida; alis anterioribus angustioribus, grossiuscule squamatis, nigris, fascia media subobliqua, in plica fracta, interdum interrupta argentea, nitida, ciliis post lineam nigram albidis; tarsis posticis nigris, apice pallidis. Exp. al. 2—2½ lin.

Stainton, List, 171; *Ins. Brit.* 304; *Nat. Hist.* i. 88, Tf. 1, f. 3; *Man.* ii. 435. *Herrich-Schæffer,* v. 350, 1096. *Frey, Linn. Ent.* xi. 417, 37.

The anterior wings are narrower than in the preceding species, and not so extraordinarily dilated posteriorly; the colour is pure black, with a faint bluish gray tinge, especially towards the apex; the fascia is silvery, very glossy, sometimes with a slight golden gloss; it runs rather obliquely to the fold, where it is angulated, sometimes rather indistinctly. I never saw it divided into two opposite spots, as it does occur, according to Stainton, but have, indeed, specimens where the angulation is in the middle. The cilia have two dark divisional lines placed more obliquely than in N. Agrimoniella and N. atricollis; moreover the frontal tuft is paler yellow than in those species. N. angulifasciella is distinguished from N. Rubivora by the yellow frontal tuft, from N. arcuatella by the whiter tips of the cilia of the anterior wings and the darker cilial line. The antennæ are short, the eye-caps white, sometimes rather yellowish.

The larva is greenish white, with green dorsal line and brownish head. It occurs in the leaves of wild roses, in shady borders of woods.

The mine is very tortuous, with slender excremental line, and generally forms large blotches.

Widely distributed.

28. N. RUBIVORA, *Wck.*

Capillis nigris, antennarum conchula albida; alis anterioribus angustioribus, grossiuscule squamatis, nigris, fascia media subobliqua, in plica fracta, argentea, ciliis post lineam nigram albidis; tarsis posticis nigris, apice albidis. Exp. al. 2—2¼ lin.

Wocke, *Vaterl. Berichte*, 1860.

? N. argyrostigma, *Frey*, *Tin.* 379, 13. *Linn. Ent.* xi. 394, 18. (The specimens with blackish frontal tuft).

All the specimens very closely resemble the preceding species, yet it is easily distinguished by the black frontal tuft. Besides, it is smaller, and the anterior wings appear rather narrower and of a more uniform width, and their colour a deeper black. The antennæ are short; the eye-caps small, pure white.

The larva and mine are quite similar to those of N. angulifasciella; the larva feeds in the leaves of Rubus cæsius in moist and shady places.

At Breslau, Brunswick, Wolfenbuttel, &c.

29. N. ARCUATELLA, *H.-S.* (*Fr.*)

Capillis ochraceis aut fusco-griseis, antennarum conchula nivea; alis anterioribus grossiuscule squamatis, nigro-cinereis, fascia media tenui subobliqua, argentea, nitida, ciliis pallide griseis, basi nigro squamatis, tarsis posticis albidis, basi grisescentibus. Exp. al. 2—2½ lin.; (Frey, 3 lin.)

Herrich-Schæffer, v. 354, 1114.

N. arcuata, *Frey*, *Tin.* 384, 21. *Linn. Ent.* xi. 415, 36. *Stt. Man.* ii. 434.

This species may be recognised by the tips of the cilia of the anterior wings being grayer, not so white, and by the paler legs; the hinder tarsi are yellowish white, and only pale gray at the first joint. The fascia has the same direction as in N. angulifasciella, but is very narrow and less conspicuous. The frontal tuft in the male is generally pale luteous or ochreous, in the female is more or less of a brownish fuscous, especially at the hinder part, yet some males occur with brownish and females with yellowish frontal tuft. The antennæ are long, yellowish gray, the eye-caps large, pure white; the colour of the slightly dilated anterior wings is more black-gray than black. The cilial line is more undefined than in the other species.

The larva is yellowish green, with the head brownish, and it feeds in the leaves of Fragaria vesca and Potentilla fragaria.

The mine is long and tortuous, with a slender excremental line. I have only noticed the autumnal brood; according to Frey there is also a summer brood.

In Switzerland, and at Brunswick, Wolfenbuttel, &c.

Group XII.

30. N. OBLIQUELLA.

Capillis ochraceis, antennarum conchula parva flavida; alis anterioribus fuscis, post medium grosse squamatis, nigris, fascia media obliqua in plica fracta albida, vix sericeo-nitente; ciliis post lineam nigram albis. Exp. al. 2½ lin.

This species agrees with those of the preceding section in the fascia being quite similarly placed, of similar form, but differs in the colour of the fascia and its want of metallic lustre; in N. tityrella and its allies the fascia is placed beyond the middle of the wing and the cilia have no divisional line; in the group of N. Salicis the anterior wings are also more coarsely scaled before the fascia, which is placed more posteriorly. The frontal tuft is ochreous; the cervical tuft and eye-caps are rather paler; the legs are pale blackish gray. The anterior wings are narrow, of uniform width, rather finely scaled before the fascia, of a gray-brown; beyond the fascia they are thickly clothed with coarse black scales. The fascia is narrow, and runs from a little before the middle of the costa obliquely to the fold, where it unites with a small spot, which lying on the inner margin beyond the middle has also an oblique direction towards the hind margin, and with it it forms nearly a right angle; sometimes instead of this it expands below the fold, forming a triangle. Its colour is whitish, very slightly inclining to yellow, with feeble silky lustre. The cilia up to the divisional line are uniformly dark, beyond it whitish and at the anal angle gray. The posterior wings and their cilia are pale fuscous.

I took some specimens in May on the edges of woods.

Group XIII.

31. N. Myrtillella, *Stt.*

Capillis rufo-ferrugineis, antennarum conchula flavido-alba; alis anterioribus fusco-nigris, cæruleo tinctis, grossiuscule squamatis, fascia subobliqua tenui albida, pone medium, ciliis griseis, basi squamis fusco-cæruleis regularibus; tarsis postice griseis. Exp. al. 2¼ lin.; (1½ lin.)

Stainton, Ann. 1858; *Man.* ii. 434.
?N. fagella, *H.-S.* v. 354, 1115.
N. Fagi, *Frey, Tin.* 384. *Linn. Ent.* xi. 412, 33.

This species is extremely closely allied to N. Salicis and its allies, and can scarcely be distinguished by constant characters. On the whole it is rather smaller than N. Salicis (I have some specimens only one line and a half in expanse); the anterior wings have the same ground colour and the same blue gloss, but are not so inclined to yellowish as is generally the case in N. Salicis, since the individual scales have not their bases yellowish, as in that species, but are more uniformly dark. The fascia is not composed of two opposite spots; it is narrow, of nearly uniform width, evidently less oblique, not so yellow, but purer white, with a faint silky lustre. The dark scales at the base of the cilia lie more regularly than those in N. Salicis and N. floslactella, and form by their ends a regular, more strongly curved divisional line, whereas in N. Salicis the scales are more irregularly placed, being rather abruptly truncate posteriorly, and some project into the outer half of the cilia. Beyond this line the cilia are of a purer pale gray, without the yellowish colouring round the apex of the wing, as in N. Salicis; at the anal angle and at the inner margin they are gray. The frontal tuft is bright rusty yellow; in N. Salicis it is more of a brownish ochreous; otherwise in both species the eye-caps and cervical tuft are yellowish white, the longer antennæ are blackish, the legs gray, the hinder tibiæ spotted with pale in the middle and at the end, the posterior tarsi are pale gray.

Since, moreover, N. Salicis and N. Myrtillella both vary to some extent in the above-given distinctive characters, the certain recognition of specimens which have not been bred is extremely difficult; indeed, I must admit that, although I have bred great numbers of both species, yet I should have referred individual specimens of one species to the other had I not been guided by the information furnished by the larvæ.

The amber-yellow larva feeds, in July and at the end of September, in the leaves of Vaccinium Myrtillus; the mine is serpentine, unless the confined space compels a blotch-like formation. The cocoon is broad and flat, rather longish, brown.

I do not doubt that N. Fagella, *H.-S.*, and N. Fagi, *Frey*, belong here. In the descriptions there is nothing opposed to this. Before I had bred N. Myrtillella I had taken it singly on the trunks of beech trees amongst N. turicella. Herrich-Schæffer, to whom I sent some, and mentioned my conjecture that the species was distinct from N. turicella, enumerated in a subsequent letter N. Fagella amongst the species which he had received from me, which could only have been N. Myrtillella. Were N. Fagella another species which mines in beech leaves, I should certainly have bred it in these latter years, but from the mined beech leaves I constantly obtained only N. turicella and N. tityrella.

Probably Von Heyden formerly took N. turicella and N. Myrtillella for one species, especially as they occur in company, and, after he had bred N. turicella from beech leaves, has through error labelled specimens of N. Myrtillella with the indication mentioned by Frey, "bred from beech leaves," or the latter has probably taken the bred specimens of N. turicella seen only hastily at Von Heyden's for a different species than the captured specimens. Frey suspects in N. Fagella the summer brood of N. Floslactella, which, from the similarity of this species with N. Salicis and N. Myrtillella, likewise confirms my notion.

According to this, N. Fagella would be the oldest name for our species; but, as it might cause confusion, it would be best to retain the name derived from the food-plant given by Stainton.

Group XV.

32. N. WEAVERI, *Stt.*

Capillis læte ferrugineis, antennarum conchula flavido-alba; alis anterioribus grosse squamatis nigris, fascia abbreviata in costa ante medium et macula in angulo anteriore argenteis, ciliis post lineam nigram albidis. Exp. al. $3\frac{1}{4}$—$3\frac{3}{4}$ lin.

Stainton, *Annual* 1855, 49, Tf. 1, f. 5; *Man.* ii. 432. *Herrich-Schæffer*, v. p. 346.

Frontal tuft ferruginous; the very long antennæ blackish; the eye-caps yellowish white. The anterior wings shining black-gray, from the coarse black scales appearing darker and almost entirely black; at the base they are generally a little paler; an oblique costal spot before the middle reaches to the fold, and just before the anal angle is a dorsal spot almost reaching to the middle of the wing; these spots are shining silvery white, sometimes rather inclining to yellow. The cilia have gray scales at the base, which with their black tips form a rather distinct divisional line; beyond this they are whitish, at the anal angle gray. The posterior wings and their cilia are fuscous. The abdomen and the legs are blackish gray; the belly and the tarsi yellowish gray.

The larva is amber-yellow, and feeds on the leaves of Vaccinium Vitis-Idæa. The mine finally becomes bladdery and inflated: the change to the pupa state takes place in an oval ochreous cocoon inside the mine: the imago makes its escape through a slight silken tube which leads from the cocoon to the skin of the leaf. I found the full-grown larva and pupa on the Upper Hartz, in the middle of June; in the lower country it occurs in May.

Also near Hanover and Glogau.

Group XVI.

33. N. SIMPLICELLA.

Capillis albis, luteo mixtis, antennarum conchula alba; alis anterioribus pallide ochraceis, post medium dilutioribus, nitidis, ciliis basi flavescentibus, apice albidis.

Exp. al. 3 lin.

This species joins on to the species of Group I., since the anterior wings are less roughly scaled and rather glossy, and the divisional line of the cilia is not so distinct. The latter is, however, still present, and only appears rather ill-defined because the colour of the cilia at their bases is also very pale.

The insect is of a very pale colour. The frontal tuft is whitish, mixed with pale ochreous-yellow; the short antennæ, the abdomen and the legs are whitish, with somewhat of a yellowish tint. The ground colour of the anterior wings is shining whitish, but thickly clothed with pale ochreous-yellow scales, which are more scanty at the base, more plentiful at the apex, but beyond the middle leave the whitish ground almost entirely uncovered. These scales are continued to the cilia, and their tips form the divisional line, which is near the margin of the wing; beyond the cilia are hair-like, but at first still yellowish, before the tips whitish, but both colours are quite distinctly separated. The posterior wings are whitish; the cilia have a faint yellowish gloss.

Very similar to Trifurcula pallidella in the colouring, but the frontal tuft is paler, and the antennæ are shorter and more slender.

Buchheister, in May, 1860, took five specimens, quite similar, on the stems of beech trees. On the Asse, near Wolfenbuttel.

Studies on the Genus Lithosia. By ACHILLE GUENÉE. Translated from the 'Annales de la Société Entomologique de France,' Vol. 1861, p. 39, by EDWARD NEWMAN: and additional Notes by HENRY DOUBLEDAY: these last are invariably followed by the initials H. D.

DURING the last five-and-twenty years Lepidopterology, at least so far as regards the study and determination of European species, has made very considerable progress: we may now say that well-named collections, which at that period, in France, were the rare exceptions, have now become the rule: nevertheless, certain families and genera still resist this onward movement, and make blots, so to speak, in the midst of even the best-named collections. The Entomological Society of France has very properly called attention to the genera Syrichtus and Eupithecia, and to the family Zygænidæ: I am now about to introduce to its notice a genus no less difficult, and much more treacherous than either: supposing it to be thoroughly known, entomologists have neglected to study it as it ought to be studied. The consequence has been that the genus Lithosia is not only one of those in which the determination of species has been peculiarly careless, but the synonymy equally inaccurate,—two defects which proceed from the same cause, the great similarity of the species to each other.

On these grounds I have concluded that I may be rendering some service to my colleagues in offering them a monographic notice of the genus; first, however, eliminating those species which present no difficulty whatever; such, for instance, as Lithosia quadra, L. rubricollis, L. muscerda, &c. In order to avoid those long descriptions which are but little read amongst ourselves, and are scarcely ever translated by our foreign colleagues, I have written Latin diagnoses, in which I have endeavoured to sum up the characters of each, as exactly as the gradations, often very difficult of definition between nearly-allied species, would permit me.

It would be quite superfluous for me to write a detailed history of the genus Lithosia, since every lepidopterist is acquainted with these long-bodied and depressed moths, with their hind wings folded like those of Crambus, — a character which misled Latreille himself, who, in his arrangement, placed them next after his Tineites, their approach to which family is purely superficial. There is no collector, even though a novice, who has not seen them flying in the twilight, both in the woods and around the lights, which attract them in great numbers; and, observing them falling suddenly into his net, and at first supposing he had struck at a large Geometer, has many a time concluded he had missed his aim, until he has examined very carefully the folds of his net, in which the insect has secreted itself.

It is also known that all their larvæ feed on lichens; but this similarity of food seems not to exercise much influence on the habits of the perfect insect. Thus we find the larvæ of L. complana and L. plumbeola in the full sunshine, upon the dry leaves which have accumulated at the foot of oak-trees, and in the warmest and most sheltered situations, in company with those of L. mesomella and L. rosea; while that of L. griseola prefers moist and shady situations. The larvæ of L. rubricollis and L. unita—so extremely alike, notwithstanding the difference of the perfect insects—are found on the branches of oak trees; while those of L. palleola and L. arideola sit during the day on rocks, and climb, morning and evening, on blades of grass; and that of L. caniola spends its life on the tiles of roofs. It is difficult, as will be seen, to reconcile habits so different with food so uniform.

Exotic species of Lithosia have an extreme resemblance to our own, of which they exhibit almost all the characters; so that they might readily be mistaken for indigenous species. I might have described several new species, but, not possessing good series of specimens, I have preferred leaving the ground entirely unexamined, thus rendering its exploration more easy to any entomologist who may hereafter address himself to the task.

I have been compelled to change several names, although well established in our French collections. I trust I shall be pardoned this act of justice, when it is seen that the prior names I have restored are often more appropriate than those which had been substituted: this good result is not always obtained from a strict adherence to the otherwise indisputable law of priority.

Sp. 1. **Lithosia cereola.** [No British example].

Sp. 2. **Lithosia unita.**

Le manteau jaune, *Geoff.* ii. p. 192 (1762); *Engr.* 219, *a*, *b*, *c*=Unita, *Wien. Verz.* C. 2; *Esp.* pl. 93, fig. 6, 7; *Bork.* 80; *Fuess. Neu. Mag.* ii. p. 212; *Schr.* 1505 = Aureola, *Hb.* 98; *God.* p. 395, pl. 40, fig. 5; *Ochs.* iii. p. 140; *Bdv. Icon.* p. 107, pl. 58, f. 2; *Steph.* p. 94, pl. 18; *Wood*, 96; *Frey*, pl. 380, fig. 3.; *Herr.-Sch.* p. 158 = Luteola, *View.* No. 4 = Aurantia, *Haw.* p. 147, No. 5.

Alæ anticæ vivide ochraceæ, unicolores, costa valde convexa; subtus atro-griseæ, margine luteo, vittaque costali usque ad medium (in mare) lutea. Alæ posticæ dilutiores utrinque immaculatæ. Thorax vivide ochraceus; abdomen griseum, ano luteo; corpore subtus pedibusque nigris. Fœmina paullo minor.

This is one of the most widely distributed of our species, and inhabits almost every country of Europe. It is found in May, in warm and elevated woods, under the leaves of trees, whence it may be obtained by beating.

The larva has some similarity to those of L. quadra and L. rubricollis; it is, moreover, slightly depressed above, and has shorter hairs than those species, but more than either L. complana or L. caniola, especially on the sides: it is of a yellow-gray colour marbled with dull green, with the usual warts, the hinder ones being larger and of an orange-yellow colour: the dorsal stripe is black; the subdorsal stripes waved, and formed by the aggregation of black marblings: on the 2nd, 3rd, 7th and 11th segments the trapezoid markings are obscured with black, and adorned posteriorly with a white dorsal spot. It feeds in August, on the lichens of different trees.

This Lithosia is clearly L. unita of all the older writers,—a very appropriate name, and one which instantly reminds us of a character which, together with the shape of the superior wings, enables us to recognize the species at the first glance. It has therefore been a great mistake to transfer the name "unita" to another species, and I think it nothing more than just to restore the name as originally employed, without expressing any annoyance at the trouble of making this alteration in our collections. We may also observe that the name "unita," taken from this species, has not been subsequently employed with any uniformity.

Sp. 3. LITHOSIA PALLIFRONS.

Zell. Entom. Zeit.

Parva. Alæ anticæ vivide ochraceæ, unicolores, costa post medium convexa; subtus atro-griseæ, vittis costali et marginali, fimbria vix latioribus, luteis costa basi nigricante. Alæ posticæ margine interiori late nigricante, nervis concoloribus, costa subtus tenuissime lutea. Corpus luteum, pectore segmentisque 5 abdominis griseis.

I have received this new species from Silesia, and it has been identified by Zeller himself. Since then I have taken it at Bourg-d'Oisans in July. It seems to frequent our mountains and lower eminences: near La Grave and Lautaret it is replaced by L. luteola.

It may be distinguished from L. luteola by its yellow head, and by the nervures of the hind wings being concolorous, &c.; and from L. pygmæola by the colour of the thorax, which is entirely yellow; by the colour of the wings, almost as bright as in L. luteola; and by the shape of the hind wings, which appear a little less triangular in the male. Nevertheless, some of these varieties approach so near to L. pygmæola that we cannot be certain of the validity of L. pallifrons as a species until we know the prior states.

Sp. 4. LITHOSIA MARCIDA. [No British example].

Sp. 5. LITHOSIA LUTEOLA. [No British example].

Sp. 6. LITHOSIA PYGMÆOLA.

Doubleday, Zool. 1914; *Wood, Suppl.* 1691; *Bdv. Icon.* p. 105, pl. 57, fig. 9 (non 10), 1834; *Dup. Suppl.* p. 30, pl. 2, fig. 5=Luteola, *Frey*, 380, fig. 4?

Parva. Pallide straminea. Alæ anticæ unicolores, basi paulo angustiores, costa vix convexa; subtus griseo-nigræ, fimbria, vitta terminali fimbriæ latitudine costæque dimidia parte luteis. Alæ posticæ, subtrigonæ, primoribus concolores, dimidio anteriori nigro-griseæ. Caput luteum. Thorax abdomenque luteo-grisea, ano stramineo. Fœmina minor, alis brevioribus plus minusve griseo lotis, costa tunc mere straminea.

France and the South of England, in dry and sandy woods, in June and July. Never very abundant. I take it in the neighbourhood of Châteaudun and about Paris, at Hublay (Seine-et-Oise).

The male varies little, but it is different with the female, which is sometimes of the same hue as the male, and sometimes tinged with gray over the whole of the upper wings. I have seen some specimens of L. arideola of the same hue, but then the costa always remains a pale yellow. It also varies much in size. Very small specimens are occasionally met with, especially in England.

I see no difference between English specimens (I have eighteen before me) and our own: however, in some of the English specimens the dark tint of the lower wings extends further than in continental ones.

I believe I have found the larva of this little Lithosia: they are of a gray earthy colour, almost without markings; but I cannot obtain the perfect insect from them. These larvæ are found under stones, and in dry and stony or sandy woods. The imago seldom quits these localities, and remains almost always on the ground. Mr. Doubleday tells me that it is taken on the sea-coast of the county of Kent, in a locality where he believes the lichen fusco-ater abounds, and probably serves as food for the larva.

It is not easy to decide by M. Boisduval's figure and description whether his male L. vitellina belongs to the present species or to L. pallifrons; and although the name of "vitellina" may be a little anterior to that of "pygmæola," I have thought it right to adopt the latter, which leaves no confusion. (Concerning the female of M. Boisduval's L. vitellina, it is very certain that it belongs to neither).

Finally, I observe that, notwithstanding the differences that I have pointed out under my remarks on L. pallifrons, and notwithstanding also the shape of the fore wings, and the colour of the thorax, entirely pale in L. pallifrons, whilst it is always more or less stained with gray in L. pygmæola, these two species seem sometimes to be united by the occurrence of intermediate individuals. It will be wise, then, to await the discovery of the larva state before defining with certainty the distinctions between the two.

Sp. 7. LITHOSIA PALLEOLA. [No British example].
Sp. 8. LITHOSIA BECKERI. [No British example.]
Sp. 9. LITHOSIA ARIDEOLA. [No British example].
Sp. 10. LITHOSIA CANIOLA.

Hb. 220; *Och.* iv. p. 196; *Godart*, v. p. 18 (in not.); *Bdv. Icon.* p. 99, pl. 57, f. 6; *Dup. Suppl.* p. 22, pl. 2, fig. 1, *a*, *b*.; *Herr.-Sch.* p. 160.

Alæ anticæ albo-griseæ, sericeæ, fimbria concolori, vitta costali albidiore, costa tenuissime fulva, versus medium convexa; subtus griseæ, margine terminali late albo. Alæ posticæ albæ, vix luteo tinctæ, margine interno lævissime griseo, diluto. Caput collareque fulva. Thorax abdomenque murina, ano in mare luteo, in fœmina concolori.

Common in central and southern France, in June. It may be met with in the interior of towns, of houses and of public buildings. I have found it even in the highest galleries of the cathedral at Chartres.

The larva lives principally, perhaps exclusively, on the lichens which grow on the walls, and especially on the tiles, of the roofs. It is of a brownish earthy colour, with a black dorsal line, and with subdorsal lines of a pale orange colour, continuous, although concealed at the incisions, and slightly bordered with black. The spiracular line is also orange-coloured and continuous. The head and feet are black. It may be found in April and May. It is figured in Duponchel's 'Iconography of Larvæ.'

It is scarcely possible that L. albeola of Hübner (No. 284) can be referred to this species. Even in making allowance for the coarseness of this figure, there still exists too great a difference for us to recognize it as that of L. caniola.

[The first British specimens of this species which I saw were taken at Torquay, by Mr. King. Mr. Barrett met with it near Dublin, where it has also been taken by Mr. Birchall. It has not, so far as I am aware, been met with in any other locality in Britain.—*H. D:*]

Sp. 11. LITHOSIA COSTALIS. [No British example].

Sp. 12. LITHOSIA COMPLANA.

Linn. S. N. 115, *F. S.* 1153; *Réaum.* i. p. 313, pl. 17, fig. 13, 14? *Geoff.* ii. p. 191 (le manteau jaune); *Wien. Verz. C.* 4.; *Fab.* 53; *Esp.* pl. 92, fig. 8 (non 7) et pl. 185, fig. 9—11; *Bork.* 77; *Engr.* 301, *a, c* (le manteau à tête jaune); *View.* No. 2; *Schr.* 1507 (le ♂ seul); *Schw.*; *Kléem.* p. 13, pl. 2, fig. 10—14; *Ochs.* p. 129; *God.* v. p. 17, pl. 41; *Frey*, pl. 380, fig. 1 et pl. 687, fig. 1; *Dup. Suppl.* pl. 1, fig. 5; *Fisch. v. Rosl.* p. 55, 104, pl. 42; *Herr.-Sch.* p. 158 = Depressa, *Wood*, 101.

Alæ anticæ angustæ, fere æquilatæ, costa vix media convexa, pallidæ plumbeo-griseæ, sericeæ, nitentes, vitta costali lata, lutea, usque ad apicem æquilata, costa ipsa tenuissime fulva; subtus obscuriores, vitta costali integra margineque lato luteis, fasciculo versus medium costæ squamoso, plicato. Alæ posticæ utrinque pallide ochraceæ, immaculatæ. Caput collareque fulva. Thorax plumbeus. Abdomen semi-griseum semi-luteum. Pedes lutei. ♀ major, alis paulo latioribus.

This is the most generally distributed of the genus Lithosia, and the most common in our country. It flies abundantly, in July, around the flowers of the clematis.

The larva is very common, in early spring, among dry leaves, under which it secretes itself during the day. It is of a brownish earthy colour, with the dorsal and subdorsal lines black, and having two dorsal series of ferruginous oval spots; these are distinct anteriorly, and separated from each other by a small dot of grayish white. The lateral region is paler, varied with black lines, in the place of spiracles, each accompanied by a very delicate distinct yellow dot. The head is black. It lives on the lichens of trees, and especially those of oaks.

A character that surely ought to be noticed in this species, but which nobody has yet spoken of, is a band of large scales situated below the middle of the costa of the fore wings, which forms a kind of fold. This character only exists in the male, and occurs only in this and the following species.

The synonymy presents several difficulties. The short description given by Réaumur applies but indifferently, although, according to him, the head and thorax are of the yellow of a dead leaf: Geoffroy, who refers to Réaumur, says it is grayish white above and below: Linneus cites Clerck's figure, which certainly represents Abrostola triplasia: lastly, Hübner, who has well represented the caterpillar, gives, under the same name, a figure which evidently represents the imago of L. plumbeola, and does not figure the present species at all, — an omission very remarkable in a species so common. These errors must be attributed, as regards the older authors, to the want of precision which prevailed in the descriptions of their time, and, as regards the last-mentioned instance, to authors having confounded two nearly-allied species.

Sp. 13. LITHOSIA MOLYBDEOLA.

Alæ anticæ angustæ, fere æquilatæ, costa vix convexa, plumbeo-sericeæ, vitta costali angustiori, vivide fulva, ad apicem decrescente; subtus nigriores, fascicula costali squamoso, plicato dimidioque costæ fulvis. Alæ posticæ pallide plumbeæ, margine (plus minusve lato) ochracea. Caput et collare vivide fulva. Thorax abdomenque plumbeo, ano ochraceo. Fœmina vix minor, obscurior, ano vix ochraceo.

My excellent friend, Mr. Henry Doubleday, having sent me, for the present work, a series of Lithosia from Great Britain, I found, among his specimens of L. complana, two which appeared to me specifically different; these had been found in a bog near Warrington, in Cheshire. At my request Mr. Doubleday pressed his correspondent to search for the caterpillar, and for additional specimens of the perfect insect. On the first point the search was fruitless; but a large number of the perfect insect were obtained, and I have now before me a score of specimens, all of which present the same characters, and confirm me in the opinion that this species is probably distinct from L. complana. Nevertheless, the question cannot be finally decided until the discovery of the prior states.

L. molybdeola is intermediate between L. complana and L. plumbeola; it has the figure of the former, the colour of the latter, and is rather more shining than either. It may be distinguished from L. complana by its darker hue, and in having the yellow costal stripe straighter, and terminating in a point before arriving at the apex as in L. plumbeola. The hind wings are always strongly tinged with gray along the inner margin, this colour even extending, in some specimens, over the whole surface, and leaving none of the usual ochreous colour visible, except a tolerably broad border, which forms a notch between the median and internal nervures. The head and neck are of a very bright yellow; the thorax and abdomen lead-coloured, this last not exhibiting any yellow except at the extremity, and the yellow even here is generally mixed with gray. The female especially has scarcely any yellow at the anus; it is of the size of the male, or smaller.

This species may be still more readily distinguished from L. plumbeola by the form of the wings, which altogether resemble those of L. complana; the gray is equally shining, the costal band straighter and more distinct, the cilia tinged with gray, the neck unicolorous, the hind wings lead-coloured, but especially by the presence of the scaly fold of the costa of the fore wings.

L. molybdeola varies much more than L. complana. It inhabits low and marshy places, and its larva in all probability feeds on the lichens which grow on the stems of the heath, or which carpet the stones that are scattered over the surface of the ground. There is no doubt that, if sought in similar situations to those in which it occurs in the North of England, it would be found in France and other countries of Europe.

[When my kind friend M. Guenée applied to me for specimens of our British Lithosiæ, I sent him two which I had received from Mr. Greening some time previously, which differed considerably from the specimens of L. complana found at Epping. Soon afterwards I received a letter from M. Guenée, in which he said that he believed they were distinct, and proposed the name "molybdeola" for the northern insect, with a request that I would not publish it before his Monograph appeared. At this time I believe no one in this country was aware that there was any difference between the northern and southern specimens.—*H. D.*]

Sp. 14. LITHOSIA PLUMBEOLA.

Albin, pl. 70, *e*, *h*. (1749); *Hb*. 100; *Herr.-Sch*. p. 158 = Lurideola, *Zinc.*; *Somm. Allg. Litterz.* 1817, p. 68; *Treits. Sup.* x. p. 162; *Frey*. pl. 637; *Dup. Gn. Chenilles* = Complanula, *Bdv. Ic.* p. 97; *Dup. Sup.* p. 15, pl. 1, fig. 4 = Complana ♂, *Esper*. pl. 92, fig. 7 (non 8); *Haw*. p. 147, No. 3; *Wood*, 100.

Alæ anticæ latiusculæ, costa post medium convexa, margine rotundato, saturate murinæ, vitta costali lutea versus apicem acutissima, fimbria strigaque basali luteis. Alæ posticæ ochraceæ. Caput fulvum. Collare griseo maculatum. Thorax abdomenque murina, segmento anali apud marem, apice ani apud fœminem, luteis.

This Lithosia, the most common except L. complana, and in many countries even more abundant than that species, is without doubt nearly allied to it; but it is going much too far to say that the larvæ alone will distinguish them. The form of the wings is very different, and, above all, the absence of the fascicle of subcostal scales is sufficient to separate the two species with certainty.

The larva is black, with a spiracular stripe of reddish yellow extending from the 3rd to the 10th segment. It associates with L. complana, and has the same habits.

Sp. 15. LITHOSIA GRISEOLA.

Le manteau bordé, *Engr*. 303, *a*, *b*, *c*, *d* (1788) = Griseola, *Hb*. 97; *Och*. p. 128; *Haw*. p. 147, No. 2; *Sepp*. iv. pl. 16; *Frey*, pl. 380, fig. 2; *Steph*. p. 96; *Bdv. Ic.* p. 95, pl. 57, fig. 5; *Dup. Sup.* p. 24, pl. 1, fig. 3; *Wood*, 102; *Herr.-Sch*. p. 160.

Magna. Alæ anticæ latæ, costa valdè convexa, suprà plumbeæ, sericeæ, fimbria pallidiore, vitta costali luteo-diluta, ante apicem desinente; subtus plumbeæ, margine latissime griseo-lutescente, vitta costali lutea, costa basi nigra, fasciculum squamosum luteum superante. Alæ posticæ griseæ, plus minusve ochraceo tinctæ, subtus ochraceæ, margine interno griseo. Corpus plumbeum, capite anoque luteis.

Of frequent occurrence over almost the whole of Europe, in small woods, July; it delights in cool, shady, and even moist situations.

It varies much, especially in the colour of the hind wings; I possess a male which has them of a pure ochre. In those specimens in which the hind wings are gray, the disk is almost invariably more yellow, even to the disco-cellular, which then forms a long distinct stripe; I possess another specimen in which the thorax is pure yellow without any trace of gray. It should also be observed that the thorax is sometimes entirely yellow, and sometimes stained with grayish lead-colour.

The larva is black, with two yellow dorsal lines composed of irregular spots: on its anterior segments these two lines become confluent; the hairs are much longer than in the larva of L. complana; the head is shining black. It feeds on the lichens growing on trees, and is much more difficult to find, at least with us, than that of the last-named species.

Var. A. STRAMINEOLA.

Stramineola, *Doubleday*, *Zool.* 1914 = Flava, *Haw.* p. 147, No. 4; *Steph.* p. 95; *Wood*, 99 = Plumbeolata, *Wood*, 103?

The whole insect is of a dingy straw-yellow colour all over, without any mixture of gray, except a slight shade on the abdomen and sometimes on the thorax.

This beautiful variety has hitherto been found only in England, and generally in marshy places. It is much more rare than the type, from which, at first sight, it appears very different; but if we study attentively its organic characters, the form of its wings, the scaly fascicle which covers the receptacle of the bristle, the shape of the body, &c., we shall find no difference between the two.

English authors have sought to identify this variety with Lithosia flava of Fabricius (Suppl. 9), which appears to me rather to be one of the varieties of L. palleola: but it is impossible to decide from so short a description; moreover, Fabricius tells us that L. flava inhabits Italy,—an additional reason for doubting the identity of the two, L. griseola being rather a northern species.

[My friend Mr. Buckler found a larva in the summer which produced my Lithosia stramineola. He kindly sent me a beautiful drawing of it, which I forwarded to M. Guenée, with reference to which he says, in a letter recently received from him, as follows: — "The first sight of this drawing caused me to think that I was right in considering L. stramineola as a variety of L. griseola. A comparison with the preserved larvæ of this species which I possess confirmed me in my opinion.

"The two caterpillars do not differ at all, either in form, hairiness or colour, except that in the drawing which you have sent me the dorsal spots are redder than in the specimens, and rather larger and more distinct. In the larvæ of L. griseola, of which I have three specimens, one has spots only on the first and last segments; the two others have the spots upon all the segments, but those upon the intermediate ones are small and almost linear. You will perceive from this that the spots vary in different individuals; and should Mr. Buckler rear a considerable number, he will probably find some amongst them with the intermediate spots smaller than in the one which he has figured.

"I have now given you my opinion of your drawing; however, if I had seen the larva in nature, I could have given a more decided opinion, as certain slight, but important, characteristics may have escaped the notice of your friend, which would either L. show stramineola to be a distinct species, or positively prove that my first opinion was correct."—*H. D.*]

Sp. 16. LITHOSIA DEPLANA.

Esper. p. 97, pl. 93, fig. 1, 2 (1786); non *Lin*. nec *Fab*. Le manteau livide, *Engr*. 302, *a*, *b*, *c*. = Complana, var., *Schr*. p. 313; *Bork*. 78 = Helvola, *Hb*. 95 (non *Clerck*) = Helveola, *Och*. p. 133; *Steph*. p. 94; *Wood*, 98; *Frey*, pl. 380, fig. 5; *Bdv*. *Icon*. p. 102, pl. 57, fig. 8; *Dup*. *Sup*. p. 24, pl. 2, fig. 2; *Herr*.-*Sch*. p. 159 = ♀ Depressa, *Esp*. pl. 93, fig. 3; *Bork*. 79; *Och*. p. 132; *Treits*. *Sup*. x. p. 164; *Frey*, pl. 380, fig. 6; *Bdv*. *Ic*. p. 101, pl. 57, fig. 7; *Dup*. *Sup*. p. 18, pl. 1, fig. 6; *Herr*.-*Sch*. p. 159 = Ochreola, *Hb*. 96 = Gilveola, *Wood*, 97?

Mas. Alæ anticæ æquilatæ, margine rotundato, farinosæ, pallide ochraceo-griseæ, vitta terminali grisea, sericea, fimbria costæque initio luteis; fasciculo subcostali squamoso prope basim. Alæ posticæ primoribus concolores, vitta latiori grisea. Caput thoraxque vivide fulva, humeris pallide terminatis. Antennæ valde ciliatæ. Fœmina valde differt, alis anticis ubique sericeis, saturate griseis, vitta costali lutea, costa convexa; alis posticis vix pallidioribus vitta terminali deficiente.

It is but lately that we recognized, as the sexes of one species, Lithosia deplana (helveola) and L. depressa. They are indeed so different that it is difficult to suppose this to be the case. The male is distinguished clearly from others of the genus by its upper wings, of which three-fourths are clothed with elevated scales, which give them a powdered or velvety appearance; they have, moreover, under the subcostal nervure, near the base, a little fascicle of scales still more developed. Finally, the antennæ are furnished with very long and strongly curved pectinations. The female, on the contrary, does not differ from other species of Lithosia in any of these respects.

L. deplana inhabits Switzerland, Germany, England, and even France; but it is very local in all these countries. The neighbourhood of Norwich, in England,* and of La Touraine, in France, are, I believe, the only localities where it has been found in these two countries.

It is needless to say that this species must not be confounded with the L. deplana of Linneus and Fabricius, which is nothing more than the male of L. quadra, and therefore ought to be struck out of the entomological vocabulary.

Var. A. UNICOLORA.

This is a beautiful variety of the female, of which the fore wings are entirely of a bright ochreous-yellow, exactly resembling L. unita (aureola). The hind wings are likewise ochreous-yellow, but somewhat paler. This variety has been communicated to me by Mr. Doubleday, together with other specimens connecting it with those of the ordinary colour. It stands exactly in the same relationship to L. deplana, as the variety stramineola to L. griseola, and furnishes me with a new reason for uniting the two insects I have last named.

Var. B. FŒMINEA.

This is a variety of the male absolute, of the same colour as the female, and which resembles it on the upper side. The wings are uniformly gray, and without any appearance of a terminal band. This curious variety, had it been more generally known, would have prolonged the illusion which induced a belief in the existence of two species.

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* [This is evidently a mistake of M. Guenée's, probably from misunderstanding my letter.—*H. D.*]

ACHILLE GUENÉE.

Entomologizing in Madagascar.—I have collected about 800, chiefly Lepidoptera, in the neighbourhood of Tamatave; but there is not any collecting-ground near. It is my intention to go up to Alamazaotra, a village on this side of the large forest. I shall start on Wednesday next, September 3rd. I hope there to have a consignment ready to forward you, if all is well. I have made an arrangement with Mr. Canonville, at Port Louis, to ship the boxes by the first vessel leaving Mauritius for England. M. Soumaque will superintend the shipping of them from Tamatave. It takes ten days to go from Tamatave to Mauritius, but should they commence running steamers it will only take three days each way. I have no doubt they will do so in a few months. The people, "natives," here are more civilized than I expected to find them; they have a great respect for, and a wholesome dread of all Europeans; I go about with them without the least fear; they are always ready to do anything for you. The Betsimisarakas are the hard-working class: the Hovahs are the moneyed men. One would take the "lamba," after reading Mr. Ellis's book, to be an elegant garment that the Hovahs wear, when you see them in reality, they remind you of dirty English table-cloths.—*Frederick Plant, in a letter to S. Stevens, dated August* 29, 1862.

Insects taken at Haslemere, Surrey, in 1862.—Ever since my arrival here, in the beginning of April last, I have worked pretty hard to see what I could make of this almost unexplored locality; unexplored, I mean, as far as Lepidoptera are concerned. The results are not unsatisfactory, as the subjoined list will show; but I am not aware that a single species has turned up that is not known to occur in other parts of the South of England. The following is a list of the more important things that have occurred:—

Satyrus Ægeria. I merely mention this species because I have observed three evidently distinct broods—one in April, a second at the end of May, and a third at the end of July. I expected a fourth in September, but the third brood lasted a long time, and larvæ from eggs laid by a female of that brood are only now full fed.

Nemeobius Lucina. I found this species worn in a wood in June.

Chœrocampa Elpenor. June; hovering at sugar.

Zeuzera Æsculi. A chance specimen occurred in August.

Hepialus sylvinus. August. Common among fern.

Anthrocera Trifolii. July. In some damp meadows, not common.

Nola cristulalis. May. Common on tree-trunks.

Epione advenaria. May and June. Common in woods, among Vaccinium Myrtillus.

Eurymene dolobraria. June, scarce.

Pericallia syringaria. July. I took a specimen on a hedge-bank, just emerged. The pupa-skin was suspended by the tail to a blade of grass.

Selenia lunaria. May, scarce.

Ennomos erosaria. October. I obtained some eggs from a female I found on a furze-bush. Their shape may be well-known, but was new to me: they were like bricks in miniature.

Boarmia consortaria. May, June. Not scarce on tree-trunks.

Tephrosia consonaria. End of April and May. Abundant on fir-trunks, but very local.

Tephrosia extersaria. End of May and beginning of June. Scarce on tree-trunks; commoner at sugar.

Geometra papilionaria. August. At rest on Pteris aquilina, late at night.

Phorodesma bajularia. July. Beaten from oak.

Ephyra orbicularia. May. Beaten from a hedge.

Asthena sylvata. May, June. In woods and hedges, not common.

Eupisteria heparata. June, July. Scarce.

Corycia taminata. May. Flying at dusk.

Minoa euphorbiata. May, June. Common in woods.

Pachycnemia hippocastanaria. April. Excessively abundant on heaths. The swarms of this species were absolutely bewildering. When I had swept up half a dozen into my net at once, and was boxing them, others would perch on the heath-tops just by, as though watching the process.

Emmelesia alchemillata. June—August. Very abundant in hedges and woods.

Eupithecia pulchellata. May, June. A few specimens occurred in different localities.

E. tripunctata. Larva on Umbelliferæ in October, not common.

E. irriguata. A specimen occurred on a larch-trunk early in May.

E. tenuiata. July, August. Beaten from oak-bushes.

Lobophora sexalata. End of May, June. On tree-trunks and in hedges, not common.

L. viretata. May, June. On birch and fir-trunks, not common.

Melanippe hastata. June. Flying wildly over a wood-path in the sunshine.

Coremia quadrifasciata. June, July. Common in lanes at one or two places.

Scotosia undulata. July. Beaten from a hedge.

Cidaria psittacata. September, October. At sugar and ivy-bloom.

C. picata. June, July. Beaten from hedges, common.

C. silaceata. May, June. Mothing, scarce.

Drepana Hamula. Apparently common in June, flying round the tops of oak trees, but quite out of reach. Odd specimens of the second brood occurred in August and September.

Notodonta carmelita. April. On birch-trunks, scarce.

N. dodonæa. May. Flew into the room, attracted by the light.

Ceropacha Or. July. At sugar, scarce.

Acronycta leporina. May. On a fir-trunk high up.

A. Aceris. July. On an oak-trunk.

Agrotis saucia. October. At sugar.

A. agathina. August, September. At heath-bloom, but very scarce.

Noctua ditrapezium. July, August. At sugar and rush-bloom, and one specimen bred.

Tæniocampa leucographa. April. At sallow-bloom. A fine set.

Dasycampa rubiginea. October. Has occurred at ivy-bloom.

Dianthœcia Cucubali. June. At blossoms of Silene inflata.

Epunda nigra. October. At sugar.

E. viminalis. July. At sugar and rush-bloom, common.

Aplecta tincta. June. At sugar, and blossoms of Silene inflata.

Hadena contigua. June. At sugar.

Xylina rhizolitha. April, October. Not scarce at sugar and ivy-bloom, and on tree-trunks.

X. petrificata. October. At sugar and ivy-bloom, not common.

Cucullia Asteris. July. Flying at night.

Stilbia anomala. August. A specimen occurred when looking for A. agathina.

Madopa salicalis. June. I beat several specimens out of oak and beech-bushes in a wood where sallow abounded.

Hypenodes albistrigalis. July. At sugar, and common at rush-bloom. Second brood in October.

H. costæstrigalis. July, common at sugar; October, scarce.

Hypena crassalis. May, June. In woods, among Vaccinium Myrtillus, not scarce.

Scopula ferrugalis. October. At sugar and ragwort-bloom, and beaten from hedges, common.

Eudorea cratægalis. July, August. Common in hedges.

E. resinalis. Mr. M'Lachlan took a specimen when visiting here in July. I have not met with the species.

E. coarctalis. September. Abundant on mossy walls.

E. pallidulalis. June. In a damp meadow.

Crambus hamellus. August. In grassy places among heath, not common.

Halias quercana. July. At sugar.

Sarrothripa Revayana. October. By beating hedges.

Tortrix cratægana. July. In woods, not common.

Dichelia Grotiana. July. Beaten from hedges.

Peronea Schalleriana. July to October. Very abundant in hedges,—a nuisance, in fact.

P. cristana. April; August to October. Beaten from hedges. Some good varieties.

P. hastiana. April, July, October. Beaten from sallow hedges.

Teras caudana. July to October. Abundant in hedges.

Ditula semifasciana. Beaten from sallow hedges.

Sericoris conchana. June, July. On some marshy meadows, not very common.

S. micana. In the same place and at the same time as the last, but very abundant.

Phoxopteryx siculana. May, June. Common.

P. uncana. May, June. Not common.

P. biarcuana. June. Beaten from sallow, scarce.

P. diminutana. June. Beaten from sallow, scarce.

P. derasana. May, June. Not common.

Grapholita obtusana. May, June. Not common.

Olindia ulmana. June, July. Common in hedges.

Carpocapsa grossana. Beaten from a hedge.

Eupicælia ambiguana. May, June. I took a fine series of this species among Rhamnus Frangula. I do not think it is attached to the birch.

Argyrolepia cnicana. June, not common.

Diplodoma marginepunctella. June. Beaten from hedges.

Tinea arcella. June to September. Beaten from hedges, not common.

T. fulvimetrella. May. Not common.

T. albipunctella. June, July. Beaten from hedges, not common.

T. nigripunctella. June. Two specimens occurred in a saddler's shop.

Lampronia quadripunctella. June. Scarce.

L. luzella. May, June. Common among brambles.

L. prælatella. June. In damp woods, flying at dusk; pretty common.

Incurvaria Zinckenella. April, May. Common among beach, flying in the sunshine.

I. Œhlmanniella. May, June. Common, flying along hedges in the sunshine.

Micropteryx calthella. May. Excessively abundant in flowers of Caltha palustris and buttercup.

M. Seppella. May, June. Common in flowers of Veronica Chamædrys.

M. mansuetella. May. One specimen occurred in a wood.

M. Allionella. May. Among Vaccinium Myrtillus, scarce.

M. Thunbergella. April, May. Flying in abundance in the sunshine round alder and sallow bushes.

Nemophora metaxella. July. By beating.

Adela fibulella. May, June. Abundant in the flowers of Veronica Chamædrys.

A. rufimitrella. May. Abundant on flowers and seeds of Cardamine pratensis; a few also on those of the common daisy.

Harpipteryx nemorella. July. Among honeysuckle, scarce.

Depressaria angelicella. July. At rush-bloom.

D. hypericella. July. At rush-bloom.

Chelaria conscriptella. August. Common in hedges. Appeared again at the end of September, but scarce.

Œcophora minutella. June. Common in a saddler's store-rooms.

Œ. tinctella. June. Beaten from hedges, not common.

Acrolepia autumnitella. May, by beating. Bred in August, from Solanum Dulcamara.

Roslerstammia erxlebella. May. Beaten from hedges.

Glyphipteryx oculatella. June. Among rushes.

G. Fischeriella. May, June. This species was abundant in flowers of Veronica Chamædrys. This habit may be well known, but was new to me.

Perittia obscurepunctella. April, May. Flying in the sunshine, common.

Tinagma sericeella. April, May. Also flying commonly in the sunshine.

Ocnerostoma pinariella. June. Beaten from fir trees.

Gracillaria phasianipennella. April. In hedges.

Coriscium cuculipennella. April, June, October. Beaten from hedges.

C. citrinella. July. By beating, and flying at dusk.

Ornix guttella. May. Beaten from a hedge.

Bedellia somnulentella. April, October. Beaten from hedges, not common.

Chrysoclista Schrankella. May. I took a few specimens sunning themselves on leaves in a marshy wood.

Lithocolletis irradiella. May. Bred from oak.

L. lantella. May. Beaten from oak.

L. Nicelliella. May. Flying along hedges.

Opostega saliciella. Beaten from a hedge.

Bucculatrix ulmella. June. Among oak.

B. frangulella. May to July. Among Rhamnus Frangula.

Pterophorus acanthodactylus. August, October. In woods and hedges, scarce.

P. punctidactylus. July. Mr. M'Lachlan first took a specimen, and some days afterwards I met with others.

From this list it is evident that I cannot echo the complaint of many other entomologists, that there have been no insects this year; indeed, the common butterflies, which seem to have failed in some places, have most of them been very abundant here. Still some things have disappeared in a most extraordinary manner. I have not seen a single specimen of either of the following: — Argynnis Paphia, A. Aglaia, A. Adippe, Thymele Alveolus, Smerinthus Populi, Sesia Tipuliformis, Hepialus Humuli, Anthrocera Filipendulæ, Nola cucullalis, Lithosia complanula, Euchelia Jacobææ, Miana furuncula, Caradrina Morpheus, C. cubicularis, Hadena oleracea, Cucullia umbratica, or Mania maura, and only one Lycæna Ægon, one Acronycta Psi, four Agrotis exclamationis, two or three Hadena dentina, one Amphpiyra Tragopogonis, and one Mania typica; and even Apamea oculea, Agrotis Segetum, Xylophasia lithoxylea and X. polyodon, Noctua xanthographa, and Cosmia trapezina were comparatively uncommon, and I am inclined to say long may they continue so, or to hope that it may be the rule in this neighbourhood. On the other hand, many things were excessively abundant, and in June and October Noctuæ came to the sugar in swarms.—*Charles G. Barrett; Haslemere, November* 15, 1862.

Description of the Larva of Nemeobius Lucina. — Ground colour dingy olive. Central dorsal line blackish or very dark olive, much darker at the centre of each segment. Subdorsal lines slanting, dark olive, dotted posteriorly on each segment by a dull yellow spot. On each segment between dorsal and subdorsal lines a largish orange tubercular spot, surmounted by a tuft of reddish orange hair. Between subdorsal and spiracular lines a similar row of smaller spots and tufts. Spiracular line indistinct, anteriorly olive, posteriorly dull yellow. Spiracles black. Head reddish yellow. Belly dirty greenish olive, destitute of markings. Feeds on the under side of the leaves of cowslip. Full-fed middle of July. Eggs white, conical, laid singly or in small clusters at the end of May and beginning of June, at the back of the leaves of cowslip. Pupa pale straw-colour. Along the centre of both thorax and abdomen a double row of largish black spots; on each side three similar rows, the intermediate row much smaller than the other two. Upper border of wing-cases black. On the head or extreme end of thorax two transverse black bands. Suspended by a thread across the junction of thorax and abdomen. In form, colour and general appearance closely resembles the pupa of M. Artemis.—*H. Harpur Crewe; the Rectory, Breadsall, near Derby, February* 8, 1862.

Lycæna Dorylas, S. V., *in England.*—In Lewin's 'Papilios of Great Britain,' published in 1795, figures are given of a Lycæna under the name of "Hyacinthus," which Lewin states he took in two successive years by the side of a chalk-hill near Dartford, in Kent. Ochsenheimer refers these figures to L. Dorylas, *S. V.* The late J. F. Stephens, in his 'Illustrations,' doubtingly gives Lewin's insect as distinct from Adonis, and in his latest publication, the Museum Catalogue, it stands as "variety *a*" of that species. I do not know whether any of Lewin's specimens are now in existence, but his figures most certainly represent the sexes of Lycæna Dorylas, which is distinguished from Adonis by its paler blue colour slightly tinged with green, immaculate cilia, and the absence of the two transverse ocelli at the base of the superior wings beneath. Mr. Cooke, of Oxford Street, recently detected two specimens of this species among a number of Adonis taken in England which he had purchased. One of these I have seen and it is certainly L. Dorylas, and now that attention has been called to it, the insect will probably be met with in the coming summer.—*Henry Doubleday ; Epping, January* 12, 1863.

Occurrence of Ino Geryon in England.—Three years ago when the question was mooted whether we had not a third species of Ino in this country, and whether that species was not Ino tenuicornis of Zeller, I paid considerable attention to the subject, and obtained the loan of specimens from several of my entomological friends. The result however was unsatisfactory, and I failed in my attempts to identify our small species in which the sexes are so similar in size with Ino tenuicornis. More recently this little species has been identified by Mr. Doubleday with Ino Geryon of Hübner, and although many entomologists still doubt its distinctness from Ino Statices, still I feel no hesitation in accepting it as a species. The subject has been recently afresh brought before me by Mr. M'Lachlan, who has kindly placed in my hands Dr. Staudinger's little monograph of the genus Ino, published in the Stettin 'Entomologische Zeitung' for 1862, p. 341. I append a translation of that learned entomologist's observations on Ino Geryon :—"This species is altogether less than Ino Statices, and measures only from 8.5 to 9. inch in the expansion of the wings: in this respect there is scarcely any difference between the two sexes, the male being scarcely inferior to the female in size, and being very much smaller than that of Ino Statices. Compared with those of that species, the antennæ of I. Geryon are shorter and stouter in the male. The colour of the fore wings is green more or less glossed with gold ; I have never observed any approach to blue. The hind wings are more transparent than those of I. Statices, and consequently appear somewhat blacker. I am the more inclined to consider I. Geryon a good species since the typical I. Statices is common near Vienna, which is almost the only locality where the real I. Geryon is found, and I am assured by an experienced collector residing there that there must certainly be two species. In the 'Transactions' of the Zoological-Botanical Society for 1852, p. 103, H. Lederer says of Ino Geryon, that Ochsenheimer is wrong when he pronounces it to be a small variety of I. Statices, from which it can be distinguished at a single glance ; it is true that H. Lederer has since abandoned this opinion, although without assigning reasons for doing so, and has treated them as constituting a single species. The important fact, however, that for many consecutive years the two races have been found unchanged in character at a short distance from each other (I am not aware whether they have been found on exactly the same spot), is a certain proof that they are distinct as species. The opinion expressed by Ochsenheimer (Bd. iv. p. 63), that I. Geryon might be a generation of I. Statices insufficiently fed, must, on careful consideration, be pronounced erroneous. Half-starved broods can certainly occur (more frequently when raised in confinement), especially if the food-plant be dried up by the heat, or other casualties of weather induce an earlier emergence from the pupa. But if I. Geryon is only to be found near Vienna in dry places, how comes it that the larvæ, led by the well-known and instinctive sense of smell (they frequently know where to find their food-plant even when miles distant), do not seek the food (which is the well-known food-plant of Ino Statices) lying so near them? Or, on the other hand, is it to be supposed that these larvæ (having no propensity for roving) do not know where to obtain their natural food, by feeding on which they might attain their natural size ; if so, how did these unfortunate insects get to a place where they must be half-starved, notwithstanding which calamity they have managed to maintain an existence for so many years? It is, at any rate, a bold assertion to make that they constitute but a single species, and one that the young naturalist should if possible avoid; it is more consistent with probability, and much more simple, to accept them as two species, admitting their distinctive characters to be still imperfectly determined, or perhaps imperfectly known. Ino Geryon has been found on the 'Gahns'* of Lower Austria, and I believe also near Digne." So far Dr. Staudinger. I may add my own opinion that Ino Statices and I. Geryon are perfectly distinct species. I believe that all the three British species of Ino occur in company in Sussex, more especially on the south coast, and I shall feel extremely obliged for a series of specimens in order that my Friday visitors may have ample means of examining and comparing them. If some of our Sussex entomologists would endeavour to obtain and describe the larvæ, and rear the perfect insect, that would add a valuable page to the Life-histories of British Lepidoptera. Since the above was written, the Rev. E. Horton, of Wick, near Worcester, has looked over my collection, and informs me that the insect I have called Ino Geryon is abundant on the Malvern Hills, and that he has always regarded it as a small or starved variety of Ino Statices.—*Edward Newman.*

Description of the Larva of Amphydasis prodromaria.—Having had a large brood of Amphydasis prodromaria to bring up this year, I have made a few observations on that species which may be interesting to some of your readers. My breeding-cages are kept out of doors, so that the times will be those of nature. I had two impregnated females. The first left the male March 14th, and I looked in vain for eggs till March 25th, when I chloroformed her in fine condition, and afterwards held a *post-mortem*, the result of which was the discovery of a tolerable quantity of eggs in her abdomen. The second parted from her spouse March 28th, but I saw no eggs till April 3rd, when, on a minute examination of the breeding-cage, I found a great number between the wire and some leno which I had gummed on outside. There were evidently two batches, so that the first female had done her duty, and they were so cleverly concealed that it required the closest inspection to detect them. I should conclude from this that, in a state of nature, the female, by means of her ovipositor, inserts her eggs in the crevices of the bark, or under the lichen with which it is covered. I had put several budded twigs of oak in the cage, but not an egg was laid on them, probably because they were too smooth. The eggs (small for the size of the moth) are greenish, with a hyaline appearance after a few days, oval, not flattened, appearing under a moderate glass to be very finely chased. Before hatching, which they began to do May 2nd, they turn of a purplish hue. The larva is at first olive with lighter spiracular line. Head light brown. After the first moult smoky; head brown mottled. Anal claspers brown. After the second moult reddish brown (some much redder than others); dorsal line a chain of dark brown markings, with ashy dashes on each side at intersections; suffused with ashy on the 8th and 9th segments. Head rather bifid. Two lateral tubercles on the 8th segment; two larger lateral tubercles on the 9th; a slightly-raised ridge on the 12th; slight ventral projections on the 8th, 9th and 10th segments. After the last moult, more suffused with ashy. Head reddish brown. Two small lateral tubercles on the 5th segment; two ventral tubercles on the 7th; two small dorsal tubercles instead of ridge on the 12th. The rest as before. I divided my brood into two parts, feeding one on oak, the other on birch, on which they thrived equally. They would also eat plum freely, and elm. They began to go under about July 6th. I turned out a number of larvæ on two birches and an elm in my field, but failed to find any pupæ at their roots afterwards, perhaps from the trees not being sufficiently isolated. With regard to the time of emerging from pupa, I observed that all the eight specimens which I had this spring came out about noon or soon after, when the temperature was highest; never in the night or in the forenoon; while Himera pennaria, which I have been breeding lately, invariably emerges during the night. I hope to make some more observations next March, and to try some experiments which I omitted to do this year.—*E. Horton; Wick, near Worcester, November* 21, 1862.

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* Will some German scholar kindly give me the meaning of this word.—*E. N.*

Occurrence of Hybernia boreata near York.—I had the pleasure of taking a very fine specimen of this insect about the middle of November, in the same locality where Mr. Birks took his two years since. It very rarely occurs near York, but that may perhaps be attributed to its being passed for H. brumata. I took it along with H. aurantiaria, which has been remarkably fine this year.—*S. J. Carrington; Clifton, York, December* 15, 1862.

Descriptions of the Imago and Larva of Eupithecia fraxinata, an English species new to Science, and also of those of E. innotata, with which it has hitherto been confounded.—I have for some time suspected that our British ash-feeding Eupithecia innotata was distinct from the typical continental species bearing that name; the habits of the respective larvæ, their colour and food-plants being so different, that it seemed to me impossible that they could belong to the same species. During the past spring, Professor Zeller kindly sent me some pupæ and perfect insects of the continental species. The former all emerged, and I hoped to have obtained impregnated eggs, but could not get any of the moths to pair. They so closely resembled our English E. innotata, that I could scarcely bring myself to think that they were distinct; at any rate I determined to wait till I could compare the respective larvæ. In the course of the summer my friend Mr. Greene obtained a small batch of impregnated eggs of our British species, from a pair of moths bred in confinement, from larvæ taken in the autumn of 1861, on ash, in Derbyshire. He sent me four; from these I reared two larvæ, and as soon as they were full-fed, despatched them to Professor Zeller, at Messnitz. He at once wrote to say that they were in every way so totally different from the larvæ of the true continental E. innotata that there could be no question whatever as to our British insect being a distinct species. A short time since, M. Zeller obligingly sent me four full-fed larvæ of the continental species, taken by himself on Artemisia campestris, their typical food-plant, at Messnitz. I at once came to the same conclusion with himself as to the specific distinction of the two insects. It is scarcely possible for two larvæ to be more dissimilar. Mr. Buckler has, with his usual kindness, drawn for me the most wondrously life-like figures of each larva, and I have myself taken accurate descriptions. I forwarded the drawings to Mr. Doubleday as soon as I received them from Mr. Buckler. He says that there can be no question whatever about the distinctness of our British insect from the continental E. innotata. With his entire concurrence, I have therefore ventured to name the former Eupithecia fraxinata, *Crewe.* It is, as far as my own experience and that of my friend Mr. Greene goes, exclusively an ash-feeder, and it is entirely impossible to give it a more appropriate title. The perfect insects are wondrously alike, almost as much so as Acronycta Psi and A. tridens; Eupithecia fraxinata is, however, invariably a darker and more dingy-looking insect. Mr. Westwood has kindly written out for me a very elaborate description of E. innotata, and has pointed out the few distinguishing characteristics of E. fraxinata. These I subjoin, together with my own descriptions of the respective larvæ. These latter are much more dissimilar than the larvæ of A. Psi and A. tridens.

Eupithecia innotata, *Hübner*.

Expanse of anterior wings in a full-sized specimen, 10—10½ lines. Fore wings gray, with a slight brownish tinge, mottled with brown and black scales. Disk somewhat paler than margins. Along the anterior margin a series of about twelve irregular-sized black spots arranged generally in pairs, and forming the anterior outlines of the paler undulated strigæ which run across the wings. From the base to the middle of the anterior margin these spots have an outward direction, but from the middle to the tip they are directed obliquely towards the base of the wing. In the middle of the wing closing the discoidal cell is a small transverse black spot; the median vein between the base and the first branch is marked with one roundish and three oblong minute black spots. The branches of the median vein, as well as the two disco-cellular and the subanal veins, are also faintly marked with blackish spots, those on the first branch of the median vein being the most strongly marked. All these spots indicate the direction of the pale obliquely undulated strigæ. Of these one near the base, two running across the middle of the discoidal cell (strongly elbowed near the middle of the cell), two beyond the middle of the wing (strongly elbowed towards the fore margin), and one subapical (strongly elbowed near the anal angle, and forming a well-marked W opposite the apical angle) are the most conspicuous. Other strigæ are faintly and indistinctly indicated. The outer portion of the wing has also a series of small dark lines running from the margin towards the disk between the veins. The outer margin itself is formed by a dark line. Fringe pale, outer portion dark, near the base a dark line. Hind wings paler than fore ones, especially on the disk. Anal portion darker, varied with short transversely undulating strigæ. At the beginning of the disco-cellular vein a very minute dark dot. Beyond the middle of the wing a denticulated dusky striga, followed by a whitish one commencing at the anal angle, beyond which the outer portion of the wing is dusky. Fringe pale at the base, darker on its outer portion, with a dark line near the base dilated into dark dots opposite the extremities of the longitudinal veins. Body griseous, slightly varied with darker scales. On each abdominal segment a small dark dot. Antennæ slightly luteous.

Eupithecia fraxinata, *Crewe*.

Expanse of anterior wings in full-sized specimen, 10⅞ lines. Fore wings of a much more uniformly brownish gray. Black markings and pale undulating strigæ similar in number and position to preceding species, but always very faint and indistinct. The white subapical strigular W barely visible, or very indistinct. Fringe much more uniform in colour than in E. innotata. Posterior wings much darker on the disk; anal portion much less strongly marked, especially towards the body; the dark and pale subapical strigæ can in fact only be traced with the greatest difficulty, though their place is indicated by the somewhat more decided markings at the anal angle.

Larva of Eupithecia innotata, *Hübner*.

Ground colour pinkish gray. Central dorsal line rusty, or dull purplish brown, connecting a series of well-defined top-shaped blotches of the same colour. Dorsal blotches margined by a number of lateral white stripes. Each lateral segment ornamented with a large orange-red and dusky purple spot. Spiracular line white. Head dusky purple. Back and sides more or less suffused with orange. Whole body rugose, studded with minute tubercles. Tapers considerably towards the head. Belly purplish gray, with a central dusky purple line margined with white. Resembles in appearance the first variety of the larva of Eupithecia nanata; the lateral stripes also recall to mind the larva of Eupithecia virgaureata. Feeds on Artemisia campestris, (Zeller), and according to Knoch and Schwaz, on A. vulgaris and A. Absinthium. It most probably occurs in this country, and any entomologist in whose locality Artemisia campestris occurs will do well to search for it. It is full-fed at the end of September and beginning of October; at least it was at the beginning of the latter month that Professor Zeller forwarded the larvæ to me. Pupa enclosed in a slight earthen cocoon. Thorax and wing-cases yellowish green, base of latter almost yellow. Abdomen pale yellowish red. Altogether paler than E. fraxinata.

LARVA OF EUPITHECIA FRAXINATA, *Crewe.*

Long, smooth, rather slender, tapering towards the head. Ground colour uniform dark green. Central dorsal line faint purplish, enlarged into a very distinct purple spot on the anal appendage. Segmental divisions yellow. Spiracular line waved, yellowish. Belly wrinkled, whitish. Central ventral line dark green. A variety occurs in which the central dorsal line is supplied by a series of dusky triangular blotches, very faint or altogether evanescent on the anterior and posterior segments. On each side is a row of slanting, faint yellow stripes, tinged with pink. Feeds upon ash. Full-fed at the end of August and beginning of September. The larva of Eupithecia tamarisciata, *Frey*, as described by Guenée, p. 332, seems in some degree to resemble this larva. Pupa enclosed in a slight cocoon, under moss on the trunks of ash. Long, slender and tapering. Thorax and wing-cases dark olive; abdomen still darker, almost black, tinged posteriorly with red. Perfect insect appears in June and July. The larvæ will feed upon flowers of laurustinus if reared frem the egg in confinement. I have described this larva as Eupithecia innotata in the 'Entomologist's Annual' for 1861, p. 136, and in the 'Zoologist' (Zool. 6610, 6770.)—*H. Harpur Crewe; The Rectory, Drayton Beauchamp, Tring, November* 12, 1862.

Leucania Loreyi (Duponchel), *at Brighton.*—On the 14th of last October, Mr. Thorncroft captured two specimens of this species in Sussex, a few miles from Brighton; they are both females, and rather wasted. On the Continent of Europe it is found in the South of France and in Spain, but appears to be rather a scarce species. M. Guenée says of it, "I have not found any essential difference between the L. Loreyi of Europe and those I received from Dr. Horsfield, which were reared from the larvæ in Java. I have also a female given to me as coming from Brazil, which is only rather smaller and a little paler in colour. It is therefore probable that this Leucania, like Heliothis armigera, inhabits a large portion of the globe. It varies in colour." Mr. Thorncroft has kindly presented one of the specimens to me. The fact that nearly all the species of Lepidoptera recently discovered in the South of England are natives of the southern portion of Europe, and are never found on the northern coast, renders it very improbable that these specimens are of continental origin. In a letter recently received from Dr. Staudinger, he remarks upon the singularity of our country, which produces so many southern forms.—*Henry Doubleday; Epping, January* 12, 1863.

Heliothis armigera in the Isle of Wight. — In looking over a collection of Lepidoptera which I made, during the summer and autumn months, at the Isle of Wight, I see in my journal that I came across a very good specimen of Heliothis armigera in the latter part of September, at Sandown, Isle of Wight. —*R. L. Lovelace; 57, Pembridge Villas, Bayswater, January* 7, 1863.

Fore Wings of Phlogophora meticulosa.—I wonder if it has ever been observed that the hind margins of the fore wings of this moth, in repose, form an elegant double-feathered head for a light in a gothic window. Any one acquainted with architecture would at once recognize the resemblance.—*E. Horton; Wick, Worcester, November* 21, 1862.

Xylomiges conspicillaris in Worcestershire.—I have bred several fine specimens of this rare species during the past five years. The pupæ were all obtained by digging in the ordinary manner, and could not be distinguished from the Tæniocampa family. I could never be certain that I had one until the moth actually appeared, which was always between 7 and 8 o'clock in the morning. My impression is that I dug them all from under elm trees; but I do not mean to say that the larvæ fed upon elm, but more probably upon "low plants," and had crawled to the base of the trees for better security in undergoing their transformation. The perfect insects emerged on the undermentioned days: — 1858: March 13th, 1. 1859: March 13th, 1. 1860: April 23rd, 1. 1861: March 27th, 1; April 10th, 1. 1862: April 3rd, 1. I must remark that the whole of the pupæ were kept in a room where there was a fire occasionally, but they were tolerably remote from its influence. The present season, for pupa digging, is certainly the worst I ever remember. There are scarcely any to be obtained in this neighbourhood; and, besides, the earth has been, and is still, so saturated with rain, that although I have often gone poking, routing and digging upon my bended knees nearly the whole day through, I have returned with but little hope of adding to my series of X. conspicillaris in 1863. — *Abraham Edmunds; The Tything, Worcester, December* 17, 1862.

Dasypolia Templi in the Isle of Wight.—On the 6th of October last I bred a specimen of Dasypolia Templi. I cannot give a description of the larva, as I took no note of it at the time I found it. In July or August I found a handsome green larva, but, thinking it to be only one of the Hadenas, I placed it with several other larvæ in a breeding-cage: I took it in a wood, at rest on broom, close to some oak underwood, and I believe it fed on the latter. When Dasypolia Templi appeared, of course my suspicion was aroused that it was produced from this said larva. I wish it to be understood that this is all conjecture. One thing only is certain, and that is I bred the insect. A few days ago I took it to Mr. Rogers, of Freshwater, who pronounced it to be a genuine D. Templi. As I have always understood the larva was unknown, I thought it might be worth noting. — *J. Pristo; Alverstone, Whippingham, December* 15, 1862.

Economy of Depressaria applana.—The sluggish habit of this little creature, when in its summer bloom, is in remarkable contrast with its liveliness in the early spring. I saw a specimen on the wall of an out-house on the 20th of August, which I can answer for having been on the same spot, and in the same position, for four days and nights, although the weather was fine and the thermometer at 60° Fahr. Mr. Stainton says that Depressariæ do not lay their eggs till spring, and probably therefore do not pair till then; and the same rule, though not without exception, is supposed to hold with all hybernating Lepidoptera. If so, Dame Nature seems more rigorous towards

hybernating Lepidoptera than modern society, with artificial requirements, to bachelors of limited means; for she counsels them to defer the happy event, in many cases (particularly in that of the active butterfly) till they are quite faded and worn. Hence probably what appears to us a sluggish habit in Depressaria is in fact a wise economy, whereby that crafty tribe accommodate themselves to circumstances, and save themselves and their wardrobes for more propitious days.—*E. Horton.*

Life-Histories of Sawflies. Translated from the Dutch of M. SNELLEN VAN VOLLENHOVEN, by J. W. MAY, Esq.

(Continued from p. 8307.)

EMPHYTUS TIBIALIS, *Panz.*

Imago, *Panzer, Fauna Germ.* 62, 11, and 147, 12. *Hartig, Aderflügler Deutschl.* i. p. 251, No. 17.
The larva is yet undescribed.

Emphytus niger, nitidus, antennarum cingulo et tibiarum basi albis, femoribus rubris.

This is the first species of Emphytus we have found occasion to describe. It appears that the larvæ of Emphytus are not very readily detected, or that they are difficult to rear; at all events, few authors have taken any note of their metamorphoses. Bouché, and subsequently Hartig, have made known to us the metamorphoses of E. cinctus, *L.*, and of E. perla, *Klug.* In addition, De Geer and Dahlbom mention the larvæ of E. rufocinctus, *Klug.*, and E. succinctus, *Klug.*; lastly, Brischke has given a figure of E. viennensis, *Schr.*; and this is the extent of our knowledge of the metamorphoses of a genus of which nearly forty species occur in Europe.

The larva of the present species was taken by me during a walk in company with Dr. Wttewaal at de Beele, near Voorst, in Gelderland. It was found for the most part coiled up in a spiral form on the upper surface of oak-leaves. We took some home for the purpose of rearing and figuring them.

These larvæ are dark olive on the back and pale gray underneath. They have twenty-two legs in all. Head anteriorly and on the upper surface clear shining black, with some minute projecting hairs; from an imaginary line running below the antennæ the face is brown, with dark brown trophi. The segments are all much wrinkled. A paler longitudinal line runs along the back; the ground colour above the legs at the side of the body was somewhat darker in ill-defined spots. The thoracic legs were obscure glassy gray, with a broad spot, which is somewhat curved in shape and prolonged downwards at the ends; the claws were brown, and on the under side at their base a cushion-like eminence was visible. The fourteen middle legs and the two hind legs were of the same colour as the belly and the side, as also the anus, but upon the outer side of each leg there was an olive-coloured spot.

These larvæ were generally rolled up spirally, so that the head was lower than the tail; when walking they were very sluggish and slow in their movements. We subsequently found that they attached themselves to the under side of the leaf as much as to the upper.

They had undergone the last moult but one. After the last moult the colouring was much paler; the head was then obscure brown instead of black; the back brownish green, but the under side had assumed a somewhat browner tint.

On the 6th of June and following days these larvæ buried themselves in the earth which was given them in their cage; they made a cocoon stuck together with grains of earth.

I was not fortunate enough to observe the pupa, but on the 5th of November of the same year I received from my friend Wttewaal two imagos, which, although probably some time previous, had emerged from the cocoon. From the colour of the antennæ and the beautiful red colour of the femora I immediately recognised the species which Panzer, in his 'Faunæ Insectorum Germaniæ Initia,' has named Tenthredo tibialis, and which had previously been taken by me at Heemstede in August, and by M. van Bemmelen at Brummen and Oosterbeek. According to Hartig it occurs in Sweden and Austria, where, however, it is scarce.

It is uncertain whether this is the same species as the T. tibialis of Le Peletier de Saint-Fargeau (Monog. Tenthred. No. 348), and which was taken near Paris, for the legs are described as somewhat differing in colour; it must, however, be the same as Gmelin's species, No. 114, which he calls T. braccata.

This pretty sawfly has the head broad, depressed, black, studded with some very short hairs; eyes also black, of moderate size, elliptic, protruding. Upper jaws rather sharp-pointed, the base and apex black, intermediate portion ferruginous; palpi black at the base, the colour inclining to gray, and becoming much paler at the terminal joints. Antennæ as long as the head and thorax together, moderately thick, more or less hairy; the first five joints dull black, the sixth, seventh and eighth clear white, the ninth smaller and black. I may here mention that in one of my examples the right antenna shows a singular variation; the fourth joint is obscure brown at the apex, the following joints are all fuscous, gradually approaching to a yellow tinge towards the extremity.

The thorax is shining black both above and below, cenchri clear white, tegulæ pale brown. Wings long and somewhat narrow, with a yellowish tinge at the base, the remainder being transparent and but slightly iridescent. The costal nervure is brownish, and the nervures bounding the anterior portion of the anal cell are orange, all the others black. The anterior portion of the anal cell is divided by an oblique transverse vein; the posterior wings have no middle cell.

Both the dorsal and ventral surfaces of the abdomen are shining black, but beset with extremely fine hairs; the seventh and eighth segments have a rather broad brown band on the dorsum.

The coxæ and apophyses are shining black, femora bright red, only that those of the fore pair of legs are blackish at the base, the extremities of the femora of the hind pair being also somewhat blackish. The tibiæ of the first pair are entirely rufous, those of the second white at the knee, rufous at the extremities, and in the last pair the tibiæ are clear white for half their length from the knee, thence to the end black with a rufous tinge, more especially on the inner side. Tarsi black, the first joint, and in some individuals the second, being white at the base. In order to give an idea of the brightness of the colouring in newly-taken examples, I have given a separate figure of a hind leg, at 3 A, somewhat more highly magnified than the enlarged representation of the female of this species in the same plate. The length of the sawfly ranges between 8 and 9 mm., the expansion being nearly 16 mm.

The saw and ovipositor of the female are very simple and of a clear brownish yellow. They are represented at fig. 4.

I do not know where the eggs are laid, nor am I acquainted with their appearance. It is not unreasonable to suppose that the female deposits her eggs in apertures made by her in the young branches, and that they remain concealed there during the winter. This being so there would be but one brood.

Anthomyia Betæ, Curtis, *and the Wurzel Crop.* — The female lays her eggs in a group on the under side of a wurzel-leaf. They are generally three in number, sometimes four, but rarely five or more. They are oblong and of a pure white. When the eggs are hatched the grub begins his work of devastation, by mining into the leaf and feasting on the inner rind. The leaf thus attacked quickly assumes a withered appearance, and looks as if blighted. When the grub arrives at maturity it drops from the leaf, and buries itself in the ground. The pupa is of a reddish brown colour. Five or six hundred roots of wurzel, which I had growing in my garden this year, were more or less injured by these grubs. Root-crops, like the wurzel, draw much of their support from the air, by means of their large fleshy leaves; and if these are injured the root of necessity suffers also by the withdrawal of such support. To show the extent of the injury inflicted by these insects, it will be only necessary to say that many leaves this year had five or six grubs in them, and that a constant succession is kept up from June to September. I never observed the leaves of the wurzel to be attacked before 1861, when they suffered severely, but not so much as this year. Before 1861 the wurzel was supposed to be safe from the attacks of all insects, and therefore a safe crop. Unlike your correspondent (Zool. 7885), I had no difficulty in procuring the pupa, and I have had as many as twenty at a time in a breeding-glass. I purpose next near to devote some time to the study of the economy of this insect, and shall be glad to furnish either eggs or pupæ, or both, to any of your correspondents that may desire them, and not be able otherwise to procure them.—*John Ransom; York.*

A Day's Beetle-Collecting on Schehallion.—During a tour in Scotland in September last, I stayed a few days at Rannoch, a small village on the Loch of that name; but more of my time there was devoted to trout-fishing than to Entomology. One very good day's sport, however, was afforded me while making the ascent of Schehallion, which is in the immediate neighbourhood. The slopes at the foot of this mountain, as well as the sides of the mountain itself, were thickly strewn with stones of various dimensions, beneath which the whole of my captures were, with few exceptions, made. The first beetle transferred to my collecting-bottle was a specimen of Pterostichus orinomus, a species then new to me. Cychrus rostratus soon followed, and beneath heath occurred Bradycellus cognatus and B. similis, the former in limited numbers, the latter in profusion. Patrobus clavipes, a late addition to our list of British species, now made its appearance, and was apparently of a very solitary character; for though I found upwards of a dozen specimens, in no case did I observe more than one specimen beneath each stone. On ascending higher Nebria Gyllenhalii was plentiful, all the examples being of a uniformly small size, having black elytra and red legs, and are most probably referrible to the variety described by Mr. Dawson in his excellent Monograph, p. 49. The only Staphylinus of any rarity was an immature specimen of Arpedium brachypterum, which I dug out from its stony habitation. On reaching the summit, where the temperature in some places was not much above freezing point, and the elevation 3600 feet, the rare Otiorhynchus maurus, a species peculiar to the northern mountains, occurred beneath moss, in company with a Homalota which I have not yet determined. On descending I turned up more P. clavipes, and a single specimen of its comparatively rare congener, P. septentrionis, another O. maurus, and a great many fragments of deceased examples of the same species. My exertions were finally rewarded by the capture of a fine pair of Aphodius fœtidus, *Fab.* (alpinus, *Wat. Cat.*) The day selected for this expedition was gloomy and the weather unfavourable, and under these circumstances my success was the more remarkable.—*H. Montague; Boxley House, Stockwell, January* 6.

Captures in the North.—Among these are several rarities (other than those detailed in the note above), a list of which will, I think, prove interesting to the Coleopterist.

Carabus arvensis. Two. Rannoch.
Calathus micropterus. Eight. In a decayed fir-stump, Blair Atholl.
Bembidium pallipes. Loch Tay.

Bolitochara lucida. Two. Kenmore.
Quedius xanthopus. Four. Under stones near birch trees, Kenmore.
Philonthus lucens. Rannoch.
Tachinus collaris. Blair Atholl.
T. laticollis. Kenmore.
Baptolinus alternans. Four. Under bark, Blair Atholl.
Geodromicus nigrita.
Cryptohypnus dermestoides. Eight. Rannoch.
Otiorhynchus monticola. Twelve. Rannoch.
O. pabulinus.
Barynotus obscurus. Blair Atholl.

I must also record the capture, at Rannoch, of Adimonia Tanaceti, its occurrence so far North having been quite unexpected.—*H. Montague ; Boxley House.*

Calosoma sycophanta in Devonshire.—On the 21st of July, this year (1862), I accompanied a botanical friend to the Devonshire Moors. In a pathway at the foot of Ugborough Beacon (a hill belonging to the Dartmoor range) there lay on the ground portions of this grand geodephagous coleopteron, consisting of both elytra, a leg, and some lesser fragments. These parts were all fresh, showing that the insect had very recently been slain and the softer portions carried off. The elytra were very brilliant, appearing as though the insect had just assumed the perfect state. Some coleopterists do not consider this insect a British species,—an opinion I concurred in until I met with it in the way just mentioned, but now feel certain it is truly an indigenous species. The woods and small forests in and about the Devonshire Moors will by-and-bye be proved to be habitats for this fine beetle. Mr. Dawson, in his 'Geodephaga Britannica,' considers Calosoma sycophanta "not truly indigenous." This opinion is arrived at because specimens of the insect have more frequently been found on the coast than inland, and because no one has testified to its being a regular inhatant of some well-known locality. I think, however, now that it has occurred in such a district as the one alluded to, and although but one specimen was observed, there must be established, in the minds of the sceptical on the point in dispute, a belief favourable to the view that this insect is truly indigenous.—*J. J. Reading ; Plymouth.*

Cryptocephalus Wasastjernæ Discovered in Britain.—I have long thought that our Cryptocephalus labiatus must include some other of the many little black species recorded by Suffrian, and I was pleased to find the other day among my specimens of that insect four or five of the C. Wasastjernæ, *Gyll.*, easily recognised by the roughly punctured thorax and different colouring of the head.—*G. R. Crotch ; Uphill House, Weston-super-Mare, November* 25, 1862.

Occurrence of Xantholinus sapphirina near Croydon.—Among some Coleoptera taken at Croydon, in the summer of 1861, and which, owing to my absence from England for a year, have not been examined till lately, is one belonging to the family Staphylinidæ, which has been ascertained to be Xantholinus sapphirina, a Brazilian insect of great beauty. It has been suggested to me (and is, I think, probably near the truth), that the insect may have been imported to Sydenham in a larva state in mould with some Brazilian plant.—*W. S. Rooke ; Pilstone House, Coleford, Gloucestershire.*

Notes on Phryganidæ, &c. — I have much pleasure in recording the capture, on May 21st, at Dunsford, of a Trichopterous insect new to Britain—Mormonia basalis, *Kolenati.* I have given a pair to the British Museum, so that other British collectors

may be able to consult the same. I have also had the pleasure of breeding Leptocerus filosus, *Linn.*, this season. The larva lives in running water, and feeds on aquatic plants, and when full-fed seals up its nearly straight case, which is made of a horny-like substance, mixed with fine grains of sand, and covered with a coarser sand outside. When the imago is about to emerge it cuts itself a little trap-door, which opens on a hinge, the door itself being perforated in the centre, corresponding to a hole at the opposite end of the cocoon, to allow for the free circulation of water. The pupa-cases are attached to bits of sticks, &c., at the bottoms of the straws. The insect emerged on June 1st. This insect fades from nearly black to rusty brown, even in the cabinet, where it is not exposed to the light.

Limnephilus vitratus. I have bred this species this year. The larva-case is comparatively fragile, composed of silk and small bits of stick laid longitudinally, and weighted at the posterior end with small stones.

Leptocerus bimaculatus of Stephens. This rare species was given me by the Rev. J. Hellins, who captured it in his garden, in August.

Perla marginata. This rather uncommon species I took at Dunsford this season.

Psocus vittatus. I took a pair of this local species near Exeter, October 18th. — *Edward Parfitt ; November* 23, 1862.

Preserving Ephemeræ. — The author of the useful "Synopsis of British Ephemeridæ," in the 'Entomologist's Annual' for 1863, complains of the difficulty of preserving specimens of that order of insects. Did it ever occur to him that they may be pressed and dried in blotting-paper, like flowers? I have before me a May-fly, which I caught in the summer, as a model for an artificial fly, and placed between two pieces of flannel in my fly-book. It has undergone no alteration, either in form or colour, since the day of its capture, and may be handled without fear of injuring it.— *C. A. Johns ; Callipers, Rickmansworth.*

Correction of Errors. — There are two errata in the description of the larva of E. arceuthata (Zool. 8343). In line 10, page 8343, "annoying distinctive differences" should be "unvarying distinctive differences;" and at line 24 of the same page, "and tip of central dorsal line" should be "anal tip of central dorsal line." — *H. Harpur Crewe.*

Proceedings of Societies.

Entomological Society.

January 5, 1863.—Frederick Smith, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be given to the respective donors:—'Proceedings of the Royal Society.' vol. xii. No. 52; presented by the Society. 'Naturhistorisk Tidsskrift Stiftet af Henrik Kroyer,' udgivet af Prof. J. C. Schiödte, Fredie Raekhes asidet Hefte; by the Editor. 'Exotic Butterflies,' part 45; by W. Wilson Saunders, Esq. 'A Manual of European Butterflies; by the Author, W. F. Kirby, Esq. 'The Intellectual Observer,' Nos. 11 and 12; by the publishers, Messrs. Groombridge and Sons. 'The Zoologist' for January; by the Editor. 'The Athenæum' for November and December; by the Editor. 'The

Journal of the Society of Arts' for December; by the Society. 'The Entomologist's Annual' for 1863; by the Editor, H. T. Stainton, Esq. 'Sitzungsberichte der k. bayer. Akad. der Wissenschaften zu München,' 1862, I. Heft 4, II. Heft. 1; by the Society.

Exhibitions.

Mr. W. W. Saunders, after making some remarks on the importance, from a commercial point of view, of a more intimate acquaintance with the various kinds of galls and their fabricators, exhibited specimens of a gall found at Reigate on the roots of the oak, and of another similar but larger root-gall recently brought from the Zulu country by Mr. Cooper: they appeared to be the production of several successive years, and formed in fact an assemblage of galls upon galls, leading to the hypothesis that the perfect insect laid its eggs within the galls of one year, and the produce of those eggs produced the galls of the following year. Mr. Saunders also exhibited another gall from South Africa which was rather soft to the touch, and was found in clusters upon a species of Cissus; it was doubtless the production of a Cynips, though the insect had not been discovered.

Mr. Saunders also exhibited living specimens of a species of Bruchus from the seeds of Erythrina Saundersonii.

Professor Westwood exhibited a large tough pouch-like larva-nest from Africa, which had been cut off from the branch of a tree to which it had been attached. The tough interior material had several holes in it, which were covered exteriorly with cone-shaped masses of woolly matter; there were evidently door-ways for the exit of the larvæ, but it was difficult to imagine that a larva which had once emerged could again effect an entrance through the same passage. The nest was doubtless that of some gregarious Lepidopterous larva, and was somewhat analogous to that of Eucheira socialis described many years ago by the Professor in the 'Transactions' of the Society. Professor Westwood also exhibited the leaves of various plants which had been mined by the larvæ of Micro-Lepidoptera, mounted on glass, with the larvæ inside their mines. This novel method of exhibiting the miners, and the shape and peculiarities of their workings, was due to Mr. S. Stone, of Brighthampton.

Mr. S. Stevens exhibited a fine Psalidognathus from Quito, and a remarkable instance of arrested development in one of the hind wings of a specimen of Papilio Pammon, brought by Mr. A. R. Wallace from the Sulu Islands.

Mr. Fenn exhibited an unusual variety of Ellopia fasciaria.

Mr. Stainton exhibited several remarkable varieties of well-known species of Lepidoptera from the collection of Mr. W. H. Bibbs, of Worcester, including Vanessa Urticæ, V. Atalanta, Arge Galathea, Arctia Caja, Eriogaster lanestris, &c.

Mr. Percy Wormald exhibited a specimen of Limnephilus nobilis of Kolenati, a trichopterous insect new to Britain, which had been captured at Ruislip, Middlesex, on the 29th of September, 1862.

Sir John Hearsey exhibited a collection of thirty-two species of Sphingidæ from India.

Papers read.

Mr. W. W. Saunders read a further paper on the genus Catascopus, and gave descriptions of seven new species, from Mr. A. R. Wallace's collection, under the names of C. Wallacei, C. versicolor, C. ruficollis, C. lævipennis, C. elongatus, C. punctipennis and C. æneus. Specimens of these, with other species of the genus, were exhibited to the Meeting.

Mr. Waterhouse read some "Notes on Omalium riparium, *Thoms.*, Homalota lævana, *Muls.*, *Kr.*, H. dilaticornis, *Kraatz*, and H. nigritula." Specimens of these species were exhibited to the Meeting.

Mr. Walker communicated a paper entitled "Characters of Undescribed South-African Lepidoptera-Heterocera, in the collection of W. S. M. D'Urban, Esq."

Major Parry communicated a paper entitled "A few Observations upon Lucanus Lama, *Oliv.*, and its Synonyma."

The President read some "Observations on Ants of Equatorial Africa," containing a criticism of some of the statements of M. Du Chaillu with respect to the ants of that region.

Mr. W. F. Kirby read a paper "On the Geographical Distribution of European Rhopalocera, in which the author expressed himself as an adherent to the Darwinian theory of the origin and development of species.—*J. W. D.*

Vitality of Sabella.—I have been noting lately with much interest the extreme vitality shown by a Sabella in a mutilated condition. The annelid was found at Ryde on the 5th of December, and came into my possession on the following day, when it appeared in health, judging by its rapid retreat into its tube on any alarm. On the 7th it seemed languid, and on the 8th was found lolling half out of its tube, and but little inclined to notice any disturbance. On the morning of the 9th the head and gills, separated from the body, were lying at the bottom of the aquarium, and the rest of the creature, which I at first thought had been devoured by a fish confined with it, was discovered at a little distance under some sea-weed. Knowing the habit of these annelids is to quit their tubes to die, I transferred both the defunct portions, as I thought them to be, into a separate vessel of sea-water, and after awhile, proceeded to put the body portion into liquor potassæ to prepare the foot-bristles for the microscope. This part was apparently dead, but on attempting to do the same with the head portion it was noticed to be still living, the one or two pairs of feet attached moving spontaneously, but they ceased to do so in the evening. During the afternoon the gills moved occasionally, and some of their pectinations were observed to curl about, but as all seemed motionless at night death was supposed to have taken place. On the following day (the 10th) similar movements were observed, and continued in the evening. From this time the appearances were regularly noted three or four times a day. The movements of expanding the gills and bending the pectinations were remarked throughout the 11th, but the feet on the body portion attached were extended and motionless, nor did they after this show any sign of life. On the 12th the gills expanded and contracted as strongly as ever, but the attached fragment of the body showed symptoms of decomposition by getting rather flocculent. 13th. Motion the same, but some of the gills had become curled at the end, and I thought they were paler; they expanded and closed, however, like the others, and their pectinations moved the same. The motion continued on the 14th, though rather languidly, and the gills were inclined to curl. 15th. The gills curled; occasionally some of them moved by slightly bending or straightening, never, however, becoming straight. They ceased to expand and contract in unison, and seemed more flaccid, obeying any movement of the water. Individual pectinations gave a decided movement now and then, bending and returning. The gills continued curled on the 16th, moving slightly at times. The pectinations

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